BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

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Order Instituting Rulemaking to Examine the Commission's Energy Efficiency Risk/Reward Incentive Mechanism.	Rulemaking 09-01-019 (Filed January 29, 2009)

PACIFIC GAS AND ELECTRIC COMPANY'S (U 39 M) PROPOSAL TO RESOLVE ISSUES IN SCOPE

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I. INTRODUCTION

In accordance with the Amended Scoping Memo dated January 22, 2016, as revised by the *Administrative Law Judge's Ruling Revising Schedule* dated February 5, 2016, Pacific Gas and Electric Company (PG&E) submits its proposal to resolve issues in the scope of this re-opened proceeding and responds to the Amended Scoping Memo questions. As PG&E discusses below, the Risk-Reward Incentive Mechanism (RRIM) decisions provided an incentive to PG&E that was consistent with the Commission's policy decisions and was just and reasonable. As such, the prior award should be re-affirmed and no refunds ordered.

II. SUMMARY OF PG&E'S PROPOSAL

A. The Commission Should Affirm Its Prior Decisions Approving The Shareholder Incentive Awards For 2006-2008.

The Commission should affirm its prior decisions approving the shareholder incentive awards for 2006-2008. The RRIM did not function as the Commission intended thus the Commission was justified in modifying the mechanism and substituting the *ex-ante* data for the disputed *ex-post* data when it calculated the final awards. Further, there were considerable unresolved disputes about the substantial decrease in the savings values in the 2006-2008 *ex-post* evaluation reports. The magnitude of these reductions to the prior savings values was not

anticipated by the Commission when it approved the RRIM.[1/] Moreover, the majority of the *ex-post* evaluation reports were not produced early enough to allow the Investor-Owned Utilities (IOUs) to modify their portfolios to respond to the extreme changes in values.[2/] Under these circumstances, the Commission should reaffirm its decision to use the *ex-ante* values used to construct and operate the portfolios, and reaffirm the prior awards.

B. If The Commission Determines To Rely Instead On The Disputed Ex-Post Values In The Energy Division Evaluation Report, The Commission Must Resolve With Testimony And Evidentiary Hearings Factual Disputes About The Calculation Of The Award.

If the Commission determines to rely instead on the disputed *ex-post* values for the 2006-2008 portfolio, the Commission must resolve with testimony and evidentiary hearings many factual disputes the Commission did not resolve in 2010. As the Commission previously noted, unresolved disputes regarding the calculation of the awards included, among other issues, the net-to-gross (NTG) ratios, effective useful life (EUL) estimates, in-service rates (ISR) of compact fluorescent lighting (CFL) and greenhouse gas (GHG) compliance costs.[3/] The Commission must also receive and evaluate additional evidence to confirm the calculations were done correctly.

For example, PG&E reviewed the 2006-2008 Energy Division Scenario Analysis Report (SAR) and found a number of errors and omitted savings which, if corrected, would demonstrate that PG&E achieved at least 65% of its MW savings metric and, therefore, should not be penalized.

PG&E also conducted an alternate scenario analyses that illustrates the substantial changes to savings and earnings calculations that would result from the corrections of errors and omissions and a resolution of other disputed issues regarding the calculation of the incentive award including some – but not all –of the disputes regarding the Evaluation Report. PG&E's

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1/ D.10-12-049, pp. 40-41, FOF 5, 7.

2/ *Id.*, pp. 40-41.

3/ *Id.*, pp. 50-51.

alternate scenario analysis shows that even if the Commission were to relitigate the awards, PG&E's award would approximate the incentive award it already received.[4/]

PG&E's alternate scenario analysis shows earnings under Scenario 7 calculated by Energy Division would increase from an obligation to refund $74.5 million to positive earnings of approximately $90 million, resulting in a 91% average goal performance rate. In addition, if the goals are recalibrated with the same *ex-post* values used in the Evaluation Report, earnings would be approximately $120 million and the average goal performance rate would be 106%. The result of PG&E's alternate analysis --which does not correct for all identified errors and thus underestimates the incentive --also supports the reasonableness of PG&E's incentive award of $104 million.

C. **Summary of PG&E's Responses To The Scoping Memo Questions.**

PG&E responds to the three questions posed in the Amended Scoping Memo as follows.

1. The Evaluation Report did not correctly implement the relative directives of the Commission. While none of the scenarios in the SAR accurately evaluate PG&E's incentive, Scenario 3, which relies on *ex-ante* data rather than the data in the Evaluation Report, produces a result that is most consistent with the intent of the RRIM.

2. The IOUs' awards for 2006-2008 were just and reasonable, both as compared to incentive awards across the country for similar portfolios and as demonstrated by PG&E's alternate scenario analysis; and

3. No refunds are due. However, if refunds were required, the RRIM requires any refunds to be offset against future shareholder incentive earnings claims.

4/ PG&E's analysis presented here and in the attached Appendices represents the research that it has been able to conduct during a short time frame to prepare these comments and without all of the necessary data to prepare a more complete analysis. PG&E requires additional data from the Energy Division and/or its consultants to prepare its testimony and final analysis and would update its alternate scenario analyses.

III. BACKGROUND

This proceeding seeks to re-examine three decisions involving the IOUs' energy efficiency incentive awards for the 2006-2008 portfolio. The IOUs' 2006-2008 portfolio goals were approved by the Commission in D.04-09-060. The savings values underlying these goals were from the 2001 Database of Energy Efficient Measures (DEER) and studies conducted in the 1990s. The portfolios, which were planned and executed with values from the 2005 DEER, were approved in D.05-09-043.

A. The Risk Reward Incentive Mechanism

In September 2007 – more than half way through the 2006-2008 portfolio – the Commission approved the RRIM, under which the IOUs were awarded shareholder incentives for their energy efficiency savings achieved in 2006-2009.[5/] The RRIM was the first mechanism to rely on a new evaluation approach and included penalties, which led to much contention. The Commission replaced the RRIM for the portfolio beginning in 2010 because it determined that the mechanism did not work as it intended.[6/]

The Commission modified the RRIM several times to address acknowledged shortfalls in the mechanism. In January 2008, the Commission modified the RRIM in several respects, two of which are important here. The Commission changed the mechanism to require the two interim earnings claims to be based on *ex-ante* assumptions using 2008 and 2009 DEER values.[7/] It also clarified that as long as a utility continues to exceed savings goals by 65% for each individual metric on an *ex-post* basis, it would not be required to refund interim incentives payments.[8/] This decision was not re-opened.

5/ D.07-09-043.

6/ D.12-12-032, pp. 3, 8.

7/ *Id*., pp. 14-16.

8/ *Id*., p. 28, OP 2 j.

B. **The Re-Opened 2006-2008 Award Decisions**

The RRIM mechanism was next modified in a December 2008 decision that also granted in part and denied in part the IOUs' joint petition to modify two prior RRIM decisions due to a delay in the issuance of the Energy Division verification report that would be used to calculate the IOUs' savings and incentives. This decision also approved the IOUs' first interim awards based on the IOUs' claims using *ex-ante* data.

In December 2009, the Commission unanimously approved the second interim awards based on *ex-ante* values verified by Energy Division in a Verification Report dated October 15, 2009.[9/] The Commission recognized that interactive effects were not reflected in the originally adopted goals and, accordingly, reduced gas therm savings goals by 11% for PG&E and San Diego Gas & Electric Company (SDG&E).[10/] It also adjusted earnings shown in the Verification Report to exclude 2004-05 cumulative savings goals, and calculated the interim awards using a 12% shared savings rate.[11/]

After the portfolio period concluded, the Energy Division issued approximately 13 draft *ex-post* evaluation reports for comment. The reports were issued in late 2009 and early 2010 with a short comment period of 2 to 4 weeks coinciding with the end-of-year holidays. Stakeholders' comment raised many questions and possible inaccuracies in the draft *ex-post* evaluation reports, but few requested changes were included in the final reports. The Energy Division subsequently published a draft 2006-2008 Energy Efficiency Evaluation Report (Evaluation Report) that incorporated the results of the *ex-post* evaluation reports. The IOUs protested what they considered to be inaccuracies in the draft Evaluation Report.[12/] The draft

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9/ D.09-12-045. The Verification Report was approved in Resolution E-4272 (Oct. 15, 2009).

10/ D.09-12-045, p. 63.

11/ *Id*., p. 82, FOF 34.

12/ PG&E's comments on the *ex-post* evaluation reports were filed in this proceeding as attachments to: *Comments Of Pacific Gas And Electric Company (U 39 M) And Southern California Edison Company(U 338-E) On The Assigned Commissioner's Ruling Providing Energy Division Report And Soliciting Comments On Scenario Runs* (May 18, 2010).

Evaluation Report reduced the savings from the *ex-ante* values used to operate the portfolio by more than fifty percent.[13/]

The Assigned Commissioner issued a ruling dated April 8, 2010 directing the Energy Division to calculate the IOUs' incentives under many different assumptions, which the Energy Division later accomplished through the issuance of a report entitled the *2006-2008 Energy Division Scenario Analysis Report,* dated July 9, 2010 (SAR). The SAR contained over 50 variations, illustrating the major swings in savings values that result from using different input assumptions. However, all scenarios in the SAR that used *ex-post* values relied on the disputed values in the *ex-post* evaluation reports.

In December 2010, the Commission approved the final true-up payment for the 2006-2008 RRIM, based on the IOUs' *ex-ante* savings values rather than the values in the *ex-post* reports summarized in Energy Division's Evaluation Report given the extensive unresolved controversies about the accuracy of the savings reductions. The Commission based its decision on Scenario 3 in the SAR which relied on *ex-ante* data, with adjusted installation rates and additional modifications to address party comments.[14/] The Commission reduced the savings rate to 7% to account for the reduced risk to the IOUs in substituting the *ex-post* values with the *ex-ante* values.[15/]

The Commission explained its rationale for modifying the mechanism. First, as the Commission noted, when it approved the mechanism, it anticipated the *ex-post* analyses would result in a swing in the earnings estimates of less than 30% rather than the dramatic reductions that resulted from the *ex-post* evaluation reports.[16/] It explained:

> In order to minimize the risk of overpayment, the Commission initially thought that the possibility of the incentives changing by

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13/ 2006-2008 Energy Efficiency Evaluation Report, Executive Summary, Table 3, p. xi.

14/ D.10-12-049, p. 53.

15/ Id., p. 70, FOF 19, 23; p. 72, COL 2; p. 74, OP 1 (b).

16/ *Id.*, p. 40.

> more than 30%, based on *ex post* review, to be relatively remote. However, the results of Energy Division's Verification Reports strongly indicate that this assumption was incorrect. For the 2006-2008 portfolios, the estimated incentive earnings the utilities would have earned if their programs were evaluated on the basis of *ex ante* assumptions would have been $307 million. Yet changes in the underlying parameters result in collective earnings declining to minus $45 million, a swing of $353 million in incentives. This represents a reduction of more than 100%.
>
> This enormous swing is entirely due to changes in the underlying parameters, *over which considerable dispute remains*. Clearly the magnitude of the shift in the incentive amounts driven by these changes far exceeds the relatively substantial 30% holdback that the Commission adopted as a buffer in D.07-09-043, to minimize the risk of overpayment. The Commission itself failed to reasonably anticipate the magnitude of the dramatic changes to the parameters underlying its assessment of energy efficiency program performance and the huge swings this would cause in the incentive calculations.[17/]

Next, the Commission determined that it would be inequitable to use the results of the *ex-post* evaluation report to calculate the incentive award because those results substantially changed the key parameters under which the portfolios were designed, approved, and executed.

> [W]e find the incentive mechanism as implemented was/is unfair to the utilities, in that it bases its results on assumptions the utilities cannot be reasonably expected to anticipate; and further, when those changed assumptions come to light, cannot be reasonably expected to respond in a way that enables them to substantially avoid the adverse impacts on the estimated performance of their programs.
>
> A more reasonable approach to assessing the 2006-2008 period for determining utilities' energy efficiency program performance and the associated incentive earnings is to rely on ex-ante assumptions. These were the assumptions the utilities used in developing the portfolio that the Commission approved in D.05-09-043 for the 2006-2008 cycle.

Finally, the Commission noted the significant disputes regarding the *accuracy* of the Evaluation Report, and determined that the disputes merited setting aside the results for the purposes of calculating the IOUs' incentive awards:

> Because we shall conduct the true-up of the 2006-2008 RRIM proceeding on the basis ex-ante assumptions, as discussed above,

17/ *Id.,* pp. 39-40 (emphasis added).

> we do not need to resolve all of the concerns raised over the course of this proceeding, in R.06-04-010 and R.09-01-019, regarding the accuracy of Energy Division's updates to various key parameters, including NTG ratios, EUL estimates, upstream CFL in-service rates, and GHG compliance costs. In our view, whether the updates to key parameters are reasonable in light of more current information is a separate question from the use of those updates for purposes of determining incentive amounts under the RRIM.[18/]

The Commission then calculated the incentives based "upon the *ex-ante* assumptions from the 2005 DEER, as the basis for the true-up of energy efficiency incentives for the 2006-2008 program cycle"[19/] with certain modifications based on information developed in the EM&V process and in parties' comments.[20/]

Based on the learnings from 2006-2008, the Commission established an EM&V dispute resolution process and instructed the Energy Division and IOUs to conduct future evaluation activities more collaboratively.[21] This collaboration has has led to improved understanding of program implementation and evaluations issues.

C. Scope Of The Rehearing Proceeding

Decision 15-09-026, which reopened the three award decisions for 2006-2008, identified four issues the Commission must consider on rehearing: (1) whether the amount of the IOUs' incentive awards is "just and reasonable"; (2) whether the incentive awards were based on calculations verified by Energy Division pursuant to the processes adopted and modified in the underlying proceedings; and (3) whether refunds are due; and (4) how any refund would be conducted.[22/]

18/ D.10-12-049 pp. 50-51.

19/ *Id.*, p. 23.

20/ *Id.*, p. 24 and Attachment A.

21/ D. 10-04-029 pp. 57-58, OP 9, 10.

22/ *Id.*, p. 78, OP 6.

IV. PG&E'S PROPOSAL TO RESOLVE ISSUES IN SCOPE

A. PG&E's 2006-2008 Award Based On Scenario 3, as Modified, Should Be Reaffirmed.

Under the circumstances presented, the Commission appropriately exercised its statutory authority in Public Utilities Code Section 1708 to modify Decision 07-09-043 by calculating the award with the *ex-ante* values rather than the *ex-post* values in the Evaluation Report to derive awards that were more consistent with the original intent of the RRIM. The Commission's decision was based on the entire record. Its decision not to base the award on the disputed *ex-post* results was an appropriate use of its discretion, given the substantial disputes about the accuracy of those results and the fact that the reports were issued after the portfolio concluded.

If the Commission were to re-open the *ex-post* evaluation results, it would be required to resolve the disputes regarding the *ex-post* reports since the Commission's findings in a decision cannot solely be based on uncorroborated hearsay evidence where the veracity and accuracy of the statements are disputed. The Commission can consider hearsay evidence such as the Evaluation Report or Scenario Analysis Report,[23/] but would need to corroborate both with admissible non-hearsay evidence and sworn testimony.[24/] The Utility Reform Network and Office of Ratepayer Advocates also argue in their joint application for rehearing of D.10-12-049 that an agency finding may not solely rely on uncorroborated hearsay evidence.[25/] Thus the Commission acted reasonably in choosing to use the *ex-ante* values rather than the unverified disputed reports to calculate the incentive awards.

23/ *The Utility Reform Network v. Public Utilities Com*., 223 Cal.App.4th 945, 959 (2014). The Evaluation Report is hearsay evidence. "Documentary evidence that is introduced for the purpose of proving the matter stated in the writing is hearsay per se because the document is not a statement by a person testifying at the hearing." *Id.,* p. 959.

24/ *Id.,* p. 961.

25/ See TURN and ORA's *Application for Rehearing of Decision 10-12-049*, p. 20 (Jan. 26, 2011), citing *Layton v. Merit Sys. Comm'n of the City of Pomona*, 60 Cal. App. 3d 58, 68 (1976) and Cal. Gov't Code Section 11513(d).

B. **Scenario 7 Incorrectly Found That PG&E Owes Penalties.**

Energy Division erroneously concluded PG&E only met 63% of its MW metric and would be required to refund its interim payments.[26/] There are errors and omissions in the SAR which, if corrected, indicate that PG&E met at least 65% of its MW metric. Corrections to Scenario 7 demonstrate that PG&E is not in the penalty range for any metric, contrary to Energy Division's conclusion, even before resolving the other major disputes addressed in Section C below.[27/]

The errors and omissions include: (1) transcription errors in the identification of 2004-2005 evaluated energy efficiency; (2) incorrect savings values for PG&E's low income energy efficiency (LIEE) program; (3) an incorrect reduction to the number of bulbs incented in 2006-2008; (4) missing savings from codes and standards work conducted during the portfolio period that resulted in savings in 2008; and (5) omitted savings (but not costs) of a PG&E Workforce Education and Training program. The required corrections and impact on the calculation of PG&E's savings as measured against PG&E's goals are summarized in Tables 1 and 2 and are discussed in detail in Sections B.1 – B.4 below.

26/ SAR, Scenario 7, p. 52.

27/ *Id*., p. 28, OP 2 j.

PG&E Table 1
Corrections to Scenario 7.1 For Errors and Omissions

	GWh	MW	MMTh
PG&E Savings as Reported in SAR Scenario 7.1	3,045.5	587.9	49.2
Transcription Error in 2004-2005 Savings	13.4	4.5	0.0
Omitted 2008 C&S Programmatic Activity	105.0	11.3	-0.5
Transcription and Calculation Errors in Low Income Energy Efficiency Savings	4.1	0.84	0.0
Misapplication of Percent of 2008 Sales deferred to 2009	28.3	3.9	-0.5
Omitted Workforce Education & Training program savings	2.3	0.6	0
Total Scenario 7.1 Savings Only With Adjustments for Errors and Omissions	3,198.5	609.0	48.2

PG&E Table 2
Revised Savings After Corrections For Errors and Omissions

Item	Goals		
	GWh	**MW**	**MMTh**
Original Goals (2004 – 2008)	4,313.0	936.0	64.4
Savings as % of Revised Goals	74.2%	65.1%	74.9%

1. Transcription Error in 2004-2005 Savings

The SAR identifies the process for determining 2004-2005 *ex-post* evaluation results, which were correctly derived from data in the Verification Report.[28/] However, the data in the excel templates used to calculate the awards contain errors and do not match the figures in the Verification Report.[29/] The values in the excel template and any resulting scenario results must be corrected to match the Verification Report *ex-post* evaluation results as published in Table 2 of the SAR.

28/ Scenario Analysis Report, Table 2, column D, p. 17.

29/ CPUC Energy Division, Energy Efficiency 2006-2007 Verification Report (Verification Report), Table 8, p. 27 (Feb. 5, 2009).

PG&E Table 3
Corrected 2004-2005 Energy Efficiency Program Savings

	GWh	MW	MMTh
Scenario Analysis Report Text	1011.6	216.8	19.1
Energy Efficiency 2006-2007 Verification Report	1011.6	216.8	19.1
Scenario Analysis Report Scenario Tables and RRMCalculator_Template_v6.2.xls	998.2	212.3	19.1

2. The CFLs Sold in 2006-2007 Were Inadvertently Reduced by The Share of 2008 CFLs Sold In 2009.

The upstream lighting program evaluation assessed the quantity of compact fluorescent light bulbs (CFLs or bulbs) installed in 2006 – 2008 and the associated energy savings. Energy Division's contractor KEMA, Inc. concluded that approximately 12% of PG&E's upstream CFLs incented in 2008 were not sold until 2009. PG&E does not dispute this adjustment. However, the 12% reduction intended for 2008 was inadvertently applied to reduce the number of bulbs incented in 2006 and 2007 in the ERT, resulting in an undercounting of installed CFLs for 2006-2007. PG&E corrects the residential upstream installation rate for 2006 and 2007 as described in Table 4 below, which increases portfolio savings by 28.3GWh, 3.9MW, and -0.5Mtherms. [30/]

30/ KEMA developed an adjustment factor to reduce the number of bulbs credited in the ERT for unverified bulbs, bulbs that left PG&E's service territory, and bulbs provided rebates in 2008 that did not sell until 2009. This adjustment factor is then multiplied by the installation rate to determine the "EDIRate" or in service rate parameter found in the ERT input files. One EDIRate was used for all years.

PG&E Table 4[31/]
Erroneous and Corrected Calculation of Residential CFL In Service Rate (ISR)

		Consultant Calculation of ISR using Erroneous Values from ULP report	Corrected Calculation of ISR	Information Source
A	Invoice / Application Verification	0.961	0.961	ULP Table 50, p. 103
B	2008 Shipments Sold in 2008 / Percent of 2006-2008 Shipments Sold in 2006-2008[32/]	0.88	0.941	ULP Table 14, p. 39
C	Leakage	0.9955	0.9955	ULP Table 15, p. 39
D	Final Adjustments to Quantity of Measures Rebated = [A * B * C]	0.86[33/]	0.90	ULP Table 12, p. 36 / Calculated
E	Installation Rate	0.67	0.67	ULP Table 26, p. 57.
F	In Service Rate [EDIRate] = [D * E]	0.5762	0.6032	Calculated

To correct the ERT input files[34/], PG&E corrected the residential upstream CFL EDIRate value from 0.5738 (rounded) to 0.6032 and the non-residential upstream CFL EDIRate value from 0.6252 (rounded) to 0.6572.

3. The SAR Calculations Erroneously Exclude Codes and Standards Savings From the 2006-2008 Cycle.

The SAR calculations include savings from pre-2006 codes and standards (C&S) advocacy, but incorrectly omit the savings from C&S activity that occurred during the 2006-2008 program cycle. For example, the 2008 Title 24 Tier II lighting standard induced savings in 2008 and should be included in the 2006 – 2008 savings and PEB calculations according to the Commission's

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31/ Table 4 shows a calculation of the EDIRate using erroneous values from the ULP report; this calculation yields 0.5762 which is nearly identical to the 0.5738 in the ERT input file. Table 4 also identifies a corrected calculation of the CFL in service rate for residential installations. Attachment 4 provides the calculation for non-residential installations and identifies the sources for the figures in Table 4.

32/ Because one in-service rate is used for the bulbs installed in all three years of the 2006 – 2008 cycle, the "2008 Shipments Sold in 2008" value was updated with the "Percent of 2006-2008 Shipments Sold in 2006-2008" value from the ULP Table 14.

33/ PG&E was unable to replicate the consultant's 0.86 calculation of the Final Adjustment (Row D). PG&E's calculation yielded a slightly lower 0.842 value.

34/ The files updated were the "Cadmus_PGE2000_ERT.txt" file for residential upstream lighting and the "PGE2080.txt" file for non-residential upstream lighting.

rules.[35/] In D.09-12-045, the Commission only excluded these benefits because the savings information was unavailable. It stated that the data should be included in the calculation of the true-up payment so the IOUs would be made whole.[36/] However, while the 2006-2008 C&S program evaluation report included savings from installations in 2006-2008 due to *pre*-2006 advocacy work, it omitted, without explanation, savings from 2006-2008 advocacy work.[37/]

Omission of these savings erroneously reduces the benefits associated with the 2006-2008 programs. Four standards went into effect in 2008 due to 2006-2008 advocacy work. These standards and the method for calculating the associated savings and net resource benefits are identified and explained in Attachment 5 and summarized in Table 5 below. The following associated savings and net benefits should be included in all scenario calculations.

PG&E Table 5
2006-2008 C&S Saving From 2006-2008 Advocacy Activities

	Savings			Benefits	
	GWh	**MW**	**MMTh**	**TRC Net Benefits**	**PAC Net Benefits**
Omitted 2008 C&S Programmatic Activity	105.0	11.3	-0.5	$22,183,170	$44,837,973

4. PG&E's Low Income Energy Efficiency Savings Are Incorrect.

Savings from the IOUs' Low Income Energy Efficiency (LIEE) programs are included in the IOUs' goals and reported total savings.[38/] The SAR describes how Energy Division calculated the LIEE savings data.[39/] PG&E found a transcription error and a miscalculation of

35/ D.07-09-043, p. 145, D.05-09-043, p. 131.

36/ D.09-12-045, pp. 65-66.

37/ "For STD 11 b General Incandescents Tier 2, the generated potential savings are out of the scope of this evaluation because it was determined to be the result of post 2006 program activity" KEMA et. al. Volume III *Codes & Standards (C&S) Programs Impact Evaluation; California Investor Owned Utilities' Codes and Standards Program Evaluation from Program Years 2006-2008* Table 3, footnote 3 (Apr. 9, 2010).

38/ D.07-09-043, pp. 146-147.

39/ SAR, pp. 19-20.

the peak savings achieved in the SAR that would require correction. The corrected results are shown in Tables 6 and 7 below using the same methodology as is in the SAR.[40/]

The GWh savings reported for PY 2008 are incorrect; PG&E's PY 2008 LIEE Program saved 27.29 GWh.[41/] The Scenario Report erroneously showed 23.21 GWh LIEE savings for PY 2008 (Table x, column D).

PG&E Table 6
Corrected 2004-2008 LIEE Program Savings

Table x. Adjusting Scenario Report GWh Values to Match Scenario Report Stated Methodology				
Program Year (PY)	**PG&E Reported**	**Commission Evaluated**	**Corrected Savings per Scenario Report Methodology**	**Incorrect Scenario Report Table 5 Data**
	GWh	**GWh**	**GWh**	**GWh**
	[A]	[B]	[C]	[D]
2004	20.13		20.13	20.13
2005	25.27	24.68	24.68	24.68
2006	27.92		27.92	27.92
2007	27.55		27.55	27.55
2008	27.29		27.29	23.21
Total			**127.57**	**123.49**

PG&E also found that the peak savings was miscalculated, because it was calculated using the demand over energy applied to the value with the transcription error, resulting in underestimated demand savings for PY 2008 (shown in Table 7, column J). PG&E's correct demand savings using the SAR methodology are shown in Table 7, column I.

40/ SAR, pp. 19-20 ("Demand impacts were not required and therefore not reported for 2004 and 2005 LIEE programs. Energy Division staff extrapolated demand impacts for those years by calculating the average ratio of demand over energy impacts for 2006 and 2007, and used that ratio to estimate the 2004 and 2005 demand impacts. These same ratios were used to estimate 2008 demand impacts. Table 6 provides the savings numbers used for the LIEE programs.")

41/ PG&E PY 2008 LIEE Annual Report, filed May 1, 2009, p. 2-18 (Table 2).

PG&E Table 7
Adjusted Scenario Report MW Values to Match Scenario Report Stated Methodology

Program Year (PY)	Corrected Savings per Table X.	Commission Evaluated Demand Values	PG&E Reported Demand Values	MW derived from Energy and Demand to Energy Ratio	Corrected Savings per Scenario Report Methodology	Incorrect Scenario Report Table 5 Data
	GWh	**MW**	**MW**	**MW**	**MW**	
	[E] = [D]	[F]	[G]	[H][42/]	[I]	[J]
2004	20.13			4.14	4.14	4.14
2005	24.68	4.59			4.59	4.59
2006	27.92		6.01		6.01	6.01
2007	27.55		5.41		5.41	5.41
2008	27.29			5.62	5.62	4.78
Total					**25.77**	**24.93**

The corrected LIEE savings shown in Tables 6 and 7 should be used to calculate savings achievements towards the MPS. If a 2004-2008 scenario is used, corrected LIEE savings of 127.6 GWh and 25.77 MW should be used for calculating savings achievements. If a 2006-2008 scenario is used, corrected LIEE savings of 82.8 GWh and 17.04 MW should be used. The values in all SAR Scenarios should be corrected as indicated above.

5. Omitted Workforce Education and Training Program

Additionally, the ERT appears to have omitted the savings from PG&E's Workforce Education and Training Program, while including the costs. The omitted savings are shown in Table 8 below.

PG&E Table 8
Saving and Net Benefits for Omitted Workforce Education & Training Program

	Savings		
	GWh	**MW**	**MMTh**
Omitted 2008 Workforce Education & Training Program	2.3	0.6	0.0

The analysis above only includes errors and omissions in the SAR. PG&E's alternate scenario analysis in Section C below includes these SAR errors and omissions and also makes

42/ H = E * Peak to Energy Ratio of 0.206.

adjustments for other major disputed issues that the Commission would be required to resolve if it recalculates the awards with the *ex-post* results.

C. If The Commission Resolved The Outstanding Disputes, PG&E's 2006-2008 Incentive Award Would Continue to Be Reasonable.

PG&E does not recommend the Commission re-calculate the incentive awards using the *ex-post* results due to the problems in those results previously identified by the Commission (among others) requiring resolution, the burden on parties and Energy Division to address the issues, and lack of value of such an exercise to the administration of the existing programs. PG&E discusses the most impactful disputed issues below, and, where possible, suggests the appropriate resolution of each issue. PG&E also presents an alternate scenario analysis to demonstrate the impact on savings and incentives if the Commission were to resolve these issues consistent with PG&E's suggestions. As PG&E's alternate analysis and the SAR show, there is a wide range of potential outcomes depending on the assumptions used to calculate the awards.

PG&E's analysis was constrained by limited time and lack of data needed to better understand conclusions of the Energy Division's EM&V consultants. PG&E did not receive all data that it requested from Energy Division. If the Commission were to use the *ex-post* data in this proceeding to recalculate the awards, PG&E would require additional time, data, and and the opportunity to make a more detailed showing to support its 2006-2008 awards. PG&E's alternate scenario, discussed below, is based on Energy Division Scenario 7 because that is the Scenario Energy Division identified as based on Commission policy. However, most of the corrections and adjustments that PG&E suggests below would also be needed in order to rely on Scenarios 4, 5, 6, 8, and 9 because these scenarios are based on the same *ex-post* results and data.

The requested corrections to the reports and savings impacts are described below. The impacts of these revisions summarized in Tables 9 and 10.

PG&E Table 9
Incremental Savings and Performance Earnings Basis
PG&E Alternate Scenario[43/]

Issue	2006 – 2008 Savings		
	GWh	MW	MMTh
Scenario Analysis Report Scenario 7-1	3,045.5	587.9	49.2
Removal of EE Portfolio 04-05 Savings	-998.2	-212.3	-19.1
Removal of LIEE 04-05 Savings	-40.7	-7.9	-1.9
Omitted 2008 C&S Programmatic Activity	105.0	11.3	-0.5
Incremental 50% of Pre-2006 C&S Advocacy	157.9	30.6	2.2
Compact Florescent Lighting[44/]	758.7	117.9	-10.9
CFLs Carried Over into Future Periods	n/a	n/a	n/a
Custom Projects	28.0	3.1	7.2
Updated GHG Value	n/a	n/a	n/a
Value for Avoided RPS Compliance	n/a	n/a	n/a
Value for NPV Impact to Costs	n/a	n/a	n/a
PG&E Scenario 7b Adjusted Savings	3,056.2	530.6	26.3

PG&E Table 10
Revised Goals and Savings
PG&E Alternate Scenario

Item	Goals		
	GWh	MW	MMTh
Original Goals (2004 – 2008)	4,313.0	936.0	64.4
Goals Revised to Remove 2004-2005 and Adjusted for Interactive Effects (2006 – 2008)	2,826.0	613.0	33.2
PG&E Scenario 7b Adjusted Savings (2006 – 2008)	3,056.2	530.6	26.3
Savings as % of Revised Goals	108.1%	86.6%	79.3%

Tables 9 and 10 do not contain a complete analysis because PG&E was unable to recommend an alternate solution to all disputed issues based on a lack of available data and

43/ PG&E's alternate scenario also includes adjustments to remove 2004-2005 and interactive effects from the goals benchmark.

44/ Six changes to compact florescent lighting were combined in one ERT input file; therefore the impacts of the changes can only be assessed in aggregate and not at an individual issue level. The issues included the misapplication of percent of sales deferred to 2009, net-to-gross, unit energy savings, incremental measure cost, the split in installations between residential homes and non-residential facilities, and burnout assumptions.

insufficient time. Each change to Scenario 7 in PG&E's alternate scenario analysis is described below.

1. All Codes and Standards Savings From Pre-2006 Activity Should Be Included.

The Commission originally limited the amount of savings from pre-2006 Codes and Standards (C&S) advocacy activity the IOUs could count towards achievement of goals to 50%.[45/] This limitation was based on concerns about the reliability of the savings data when the mechanism was established.

In April 2010, the Commission addressed the issues about counting pre-2006 advocacy achievements towards the IOUs' goals and concluded that its prior concerns about the data were "sufficiently resolved to allow 100% of the savings to be counted towards energy efficiency savings goals."[46/] The Commission determined that it was appropriate to count 100% of C&S savings toward the 2010-2012 cumulative goals based on its finding that: "…better technical data about savings is now available as compared to when the original 50% determination was made in D.05-09-043, including Evaluation Protocols and elimination of concerns about double-counting and base case forecasts."[47/] The SAR scenarios should be modified to include 100 percent of the efficiency savings from pre-2006 C&S advocacy consistent with Decision 10-04-029. PG&E's alternate scenario increases the counting of pre-2006 advocacy savings to 100 percent of the evaluated net savings, but does not make any associated changes to net benefits.

2. All Scenarios Would Require Correction To Exclude 2004-2005 Results And Goals.

In Decision 09-05-037, the Commission determined that the "2004-2005 data are not fully appropriate for inclusion in cumulative savings goals, because the evaluation data for those years was not consistently reported or governed by the California Evaluator's Protocols, and 2004-

45/ See D.10-04-029, p. 46.

46/ *Id.*, p. 51, FOF 30; p. 53, COL 20, p. 59, OP 16.

47/ *Id*., p. 46.

2005 data is not directly reconcilable with 2006-2008 data."[48/] It also concluded that "[t]he 2004 and 2005 data should not be used for cumulative savings purposes for this [2009-2011] program cycle."[49/] As a result, the Commission concluded that "[f]or the purposes of measuring interim incentive earnings for the 2006-2008 cycle, we agree that it is appropriate to exclude the effects of cumulative goals starting from 2004, as reflected in the Verification Report."[50/] The same principle of excluding the cumulative effects of the 2004-2005 program cycle should apply to calculate incentives here and all scenarios should be modified accordingly. As noted in the Verification Report, "the Commission officially removed the savings for the 2004-2005 program cycle from the cumulative savings targets for the 2010-2012 cycle, but it did not explicitly remove it from the 2006-2008 cumulative savings goals.[51/] ED left the savings in when it calculated most scenarios.[52/] The ERT should exclude the cumulative effectives of the 2004-2005 program cycle results and goals.

In the event that the 2004-2005 savings are not excluded from cumulative goals and savings achievements, the transcription error discussed above in Section B.1 should be corrected.

3. PG&E's Gas Goals Should Again Be Reduced To Account For Interactive Effects.

The 2006-08 goals did not include the impacts of negative therm interactive effects. During the 2006-08 cycle, negative therm interactive effects were incorporated into DEER saving values, resulting in significant negative therm savings impacts. In recognition of this inconsistency, the Commission, in Decision 09-05-037, reduced PG&E's therm goal by 26% for

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48/ D.09-05-037, p. 54, FOF 4.

49/ D.09-05-037, COL 1.

50/ D.09-12-045, p. 67, see also FOF 26 ("In D.09-05-037, the Commission determined that 2004-2005 data should be excluded from cumulative goals on a prospective basis for the 2009-2011 cycle. While D.09-05-037 has applicability for measuring cumulative savings goals on a forward looking basis, similar principals apply to the savings goals used in determining 2006-2008 RRIM incentive earnings.")

51/ Verification Report, p. 100.

52/ The methodology used to calculate the 2004-2005 savings is described in the Scenario Analysis Report, pp. 17-19.

years 2009-2011 to account for interactive effects that were not included in the goals studies that informed the 2004 goals decision. The 26% reduction was based on the analysis performed in the 2009 Verification Report.[53/] Decision 09-12-045, which approved the second interim incentive claim, recognized that this was also an issue for 2006-08 and reduced PG&E's therm goals by 11%, with additional changes deferred to the 2010 RRIM true up.[54/] However, the 11% reduction was not based on a technical analysis but rather an analysis of the impact on awarding incentives.[55/] The issue was not resolved in the True-Up Decision because it would not have had a material impact on the incentive award that relied on *ex-ante* values.[56/] Because this issue was not resolved for 2006-2008, the Commission should apply the 26% reduction of PG&E's therm goal, which was based on a data analysis and was previously approved in D.09-05-037. A 26% reduction should be applied to PG&E's 2006-08 therm goal, reducing the goal from 44.8 MMTherms to 33.2 MMTherms.

4. The Program Non-Incentive Costs Should Be Corrected by Discounting Costs Incurred in Future Years.

The cost effectiveness calculator used by the ERT inappropriately uses the full value of the 2007 and 2008 non-incentive program costs without discounting those costs. The Energy Efficiency Policy Manual requires the use of a discount rate to calculate the TRC and PAC results.[57/] The discount rate should be applied to both the benefits and the costs. The cost effectiveness calculator appropriately discounts the future incentive costs as well as the future stream of benefits accruing due to energy efficiency activities occurring during the program

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53/ D.09-12-045, p. 63.

54/ *Ibid.*

55/ *Id.*, pp. 63-64.

56/ D.10-12-049, p. 58.

57/ Energy Efficiency Policy Manual, Version 3.1, Attachment 1, p. A6, Sec. 4, ¶¶ 2 , 3. ("The TRC should be calculated utilizing a discount rate that reflects the utilities' weighted average cost of capital, as adopted by the Commission … Like the TRC test, the PAC test should be calculated utilizing a discount rate that reflects the utilities' weighted cost of capital.")

period. However, the calculator does not have the functionality needed to discount the non-incentive costs.

To remedy this error, PG&E applied the known discount rate of 7.49% as present in the E3 calculator[58/] to the second and third year of the non-incentive costs. PG&E accrued 2006-2008 non-incentive costs at the portfolio level as summarized in Table 11 and as detailed in Appendix A Table A.9:[59/]

PG&E Table 11
PG&E 2006 – 2008 Non-Incentive Costs[60/]

	2006	2007	2008
PG&E Non-Incentive Percentages	18.03%	32.73%	49.24%
Costs by Year	$82,591,227	$149,957,973	$225,565,437

The simple sum of these non-incentive costs, $458,114,637, was included in the calculation of both TRC and PAC net benefits, whereas only $ 417,325,442, the discounted net present value of these non-incentive costs, should have been included. PG&E corrects this error by adding the difference of these two numbers or $(40,789,195) to the TRC and PAC net benefits as indicated in Appendix A Table A.8.

5. The Updated GHG Value From 2008 Should Be Used.

In Decision 10-04-029, the Commission directed Energy Division to update the avoided cost GHG adder to $30 per ton based on the 2008 Market Price Referent (MPR).[61/] Since the 2008 MPR represented the best available information regarding the avoided cost of GHG prices

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58/ Specified in the "Calculations" worksheet of the E3 calculator workbook in cell C3.

59/ PG&E's appendices are made available on line. See PG&E's Notice of Availability (NOA) served concurrently.

60/ Total 2006-2008 non-incentive costs are included in the ERT in Table IOU_E3_cost_Q42008. Breakdowns of the costs by year are from PG&E's Quarterly Report Submission dated March 1, 2009 for the resource programs and from PG&E's Annual Submission, dated May 1, 2009, for the non-resource programs.

61/ D.10-04-029, *Decision Determining Evaluation, Measurement and Verification Processes for 2010 through 2012 Energy Efficiency Portfolios*, p. 53, COL 17.

at the time of the evaluation, it should be used to evaluate the benefits associated with the IOUs' 2006-2008 energy efficiency portfolios. The ERT used an E3 cost-effectiveness calculator with an embedded price of carbon that escalates from $9 - $22 per ton. This is the GHG avoided cost in the Commission's Avoided Cost model from 2005.[62/] PG&E has updated its ERT model to include the 2008 price (see method in Attachment B.1), which would result in a PEB increase of $165,416,787 and an incentive increase of $ $14,887,511 at a 9% earnings rate.

6. The E-3 Calculator Should Include an Avoided Cost Premium for Renewable Portfolio Standard (RPS) Compliance

An avoided RPS cost premium has been included in recent California avoided cost model updates in recognition that the procurement cost of RPS-eligible energy and capacity was typically higher than the procurement cost of conventional energy and capacity. By reducing customer demand, energy efficiency also reduces the quantity of RPS energy required to be purchased. In this scenario, PG&E, consistent with current E3 calculators, added a renewable cost premium to the avoided costs embedded in the E3 cost effectiveness calculator to better represent the costs avoided by PG&E's 2006-2008 portfolio.

The process to add the avoided RPS value involves estimating the renewable cost premium (the costs over and above conventional generation costs) that RPS contracts carry, then calculating the portion of these costs that would be avoided by reducing load through energy efficiency and, where applicable, other demand-side resources.

An avoided RPS cost premium was not included in the avoided cost calculator for energy efficiency until 2011 although RPS requirements originally started in 2006. RPS purchase requirements mandated at that time included clear compliance dates. Senate Bill 107 required a 20% RPS by December 31, 2010. In 2008, the RPS purchase requirement was increased to 33% RPS by 2020.[63/] Reductions to load arising from EE reduced the required energy purchases to

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62/ "cpucAvoided26.xls" was published on E3's site on 4/25/2005. https://ethree.com/public_projects/cpuc5.php.

63/ SB 107 is available here: http://www.energy.ca.gov/portfolio/documents/documents/sb_107_bill_20060926_chaptered.pdf

meet the RPS targets and resulted in substantial cost savings, particularly given the high prices originally paid for RPS procurement. An avoided RPS cost premium should have been included in the avoided cost calculator because it was a benefit of EE procurement.

To correct for this omission, PG&E used the methodology in the current version of the avoided cost calculator[64/] and modified the parameters to align with the RPS requirement in place at the time (a 20% requirement in 2010 and 33% requirement in 2020). PG&E then took the resulting avoided RPS costs, which range from 10 – 17 $/MWh, and added these to the hourly energy value results of the 2006 avoided cost model (See NOA, Appendix B.1 for details). This is consistent with how the value is incorporated in the current calculator.

PG&E used the updated E3 cost effectiveness calculator in the ERT to assess the incremental impact of the avoided RPS on the portfolio net benefits. Including the avoided RPS cost premium results in a PEB increase of $ 57.48 million and an incentive increase of $ 5.17 million at a 9 percent earnings rate.

7. There Are Material Errors in the Evaluation Report Savings Used To Calculate The Incentive Awards In Scenarios 5 through 9.

As the Commission noted in 2010, there are substantial unresolved disputes regarding the Evaluation Report.[65/] The *ex-post* evaluation reports contain errors and assumptions that are difficult to verify. The Evaluation Report relies on the *ex-post* evaluation reports and thus repeats the errors found in the evaluation reports.

The IOUs' and other parties' comments detailed errors, disputed assumptions and, in some areas, deviations from Commission Decisions in the Draft Evaluation Report.[66/] The IOUs' concerns regarding the draft report were largely unaddressed in the final report. The RRIM decision requires the Energy Division to respond in writing to all comments and consider and

64/ Available here: https://ethree.com/documents/DERAvoidedCostModel_v3_9_2011_v4d.xlsm

65/ D.10-12-049, pp. 50-51.

66/ See e.g. *Southern California Edison Company's Comments on the Energy Division's Draft 2006-2008 Energy Efficiency Evaluation Report* (May 17, 2010). SCE's comments attached PG&E's comments on the Draft Report.

deal with them in a reasonable manner.[67/] Thus it is now left to the Commission to affirm its prior use of *ex-ante* values or address the parties' comments.

a. The Compact Florescent Lighting Reductions to PG&E's Reported Savings Were Disputed, and Remain Unsupported

The majority of reductions to PG&E's reported savings were due to disputed and controversial reductions in savings values for PG&E's Upstream Lighting Program. The *ex-post* evaluation report concluded that "the IOUs realized about 25% of their ex-ante claims for net energy and 20% of their peak demand reduction claims."[68/] These reductions had a significant impact on the calculations presented in the Scenario Analysis as the IOUs' combined Upstream Lighting Program "accounted for over half (56%) of the expected net kWh and 42% of the expected net kW reductions for the total statewide portfolio."[69/] Below PG&E explains why certain of these adjustments were unwarranted.

(1) Net-to-Gross Estimates were Unreasonably Low

The net-to-gross ratio (NTG)[70/] is an estimate of the fraction of savings that are attributable to the program. For example, a NTG of 0.80 means 80% of savings are attributable to the program, while 20% would have occurred in the absence of the program. The evaluation NTG estimates for the Upstream Lighting Program are unreasonably low and unfairly reduce first year net savings and PEB net benefits. The Commission should instead use the *ex-ante* values.

The consultants estimated NTG values using different methods including supplier self-reports, consumer stated preference, conjoint model, revealed preference purchase model, and stated preference purchaser elasticity model. The resulting NTG values varied widely, ranging

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67/ D.07-09-043, p. 132.

68/ Upstream Lighting Evaluation Report, Volume 1, p. xiii (KEMA, Inc., Feb. 8, 2010).

69/ *Id*., p. xi.

70/ NTG is defined as the ratio of net savings to gross savings, expressed either as a unitless fraction or percentage. Since spillover credit was not allowed in 2006-08, net savings in that period were gross savings minus free ridership savings. As a mathematical result, NTG = 1 – (free rider savings fraction).

from 0.06 to 1.0. Ultimately, the consultants selected values for each distribution channel. The method used to select the NTG values is not readily apparent and does not appear to be uniform across the different distribution channels.

The Natural Resource Defense Council's (NRDC's) Senior Scientist, Peter Miller, conducted an analysis that demonstrated that the upstream lighting program NTG ratio should be greater than 1.0[71/] rather than the 0.54 statewide average and 0.49 value assigned to PG&E in the upstream lighting impact study. Mr. Miller's assessment shows that actual sales trends for CFLs do not comport with the NTG value adopted by the Commission and he suggests that a NTG value of 1.0 is appropriate given actual market trends:

> …the estimated NTGR of 54% from the ULP Evaluation Report is based on an implicit assertion that in 2003 sales were somehow poised to grow at the extraordinarily rapid rate of 74% per year for five years running and then plummet by 44%, despite modest at best sales growth from 2001 to 2003. But even if one assumes that sales would have risen at 37% per year based on sales growth in other states, the NTGR in 2008 should be 102%, nearly twice the "best judgment" estimate from the ULP Evaluation Report. The bottom line is that the proposed NTGR of 54%, which is based solely on a consultant's judgment, is unsupported by readily available evidence. National sales data from 2003 to 2008 and the decline in sales in California in 2009 demonstrate that this NTGR estimate is far too low and the ULP was likely responsible for savings at least twice as large as the estimated in the Evaluation Report. This conclusion is supported by the stated preference analysis in the ULP Evaluation Report itself.[72/]

PG&E also raised its concerns about the inaccuracy of the NTG value to the Energy Division, specifically addressing three issues: (1) the unreliability of self-report survey results; (2) the lack of an adequate method to accurately estimate NTG values; and, (3) the counterintuitive results generated by the self-report surveys.[73/] The evaluation consultant

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71/ Miller, Peter, Natural Resources Defense Council, *Reanalysis of the 2006-08 Upstream Lighting Program* (June 2011).

72/ *Id*., p. 15.

73/ PG&E Comments on the Draft Evaluation Report: Upstream Lighting Program (Dec. 17, 2009); Residential Retrofit High, (Jan. 7, 2010). PG&E's comments on the *ex-post* evaluation reports

testified before the Public Service Commission of Wisconsin that "[s]elf report with multiple influences, especially for residential programs, is pretty unreliable."[74/] Yet, the same consultant used this unreliable reporting method as the basis for the NTG values.

PG&E identified several factors which impact the validity and accuracy of the NTG value.[75/] The studies' NTG ratios were based on inadequate sample size, insufficient response levels, the 1.5 to 3 year delay in surveying customers regarding their motivation for participating in energy efficiency programs, and/or the difficulty in determining program influences. Considering the material flaws in the way survey results were used to calculate the NTG ratios, PG&E believes the resulting NTG ratios were neither credible nor reliable.

The Commission should instead use the non-residential *ex-ante* NTG value of 0.96 and residential NTG *ex-ante* value of 0.80. These are conservative assumptions relative to the NTG calculated by NRDC based on market trends data.

(2) Unit Energy Savings Should Be Increased.

The Energy Division used the average hours of CFL operation and the difference in wattage between CFL and incandescent lamps (delta watts) from the Upstream Lighting Program impact study to estimate gross energy savings from the IOUs' Upstream Lighting Program. The Energy Division used 2009 data from field studies for the entire 2006-2008 period. The Energy Division should have used earlier data for the 2006-2007 period as customer usage patterns for these bulbs changed during the three-year period. Using 2009 UES values for the entire 2006 to 2008 results in lower gross first year savings and downward biased PEB net benefits for the program cycle.

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were filed in this proceeding as attachments to: *Comments Of Pacific Gas And Electric Company (U 39 M) And Southern California Edison Company(U 338-E) On The Assigned Commissioner's Ruling Providing Energy Division Report And Soliciting Comments On Scenario Runs* (May 18, 2010).

74/ Cadmus Comments re: Evaluation Issues/Quad*rennial Planning Process,* 11/23/09, p. 2, PSC REF#:123882.

75/ See PG&E's comments on the reliability of the NTG value in its comments on the Draft 2006-2008 Energy Efficiency Evaluation Report (May 18, 2010).

Customers were installing CFLs in more highly lighted, highly used areas of the house in 2006 than in 2009. For example, as the new CFLs came on the market in 2006, customers may have purchased a few to try in kitchens – a brightly lit, highly utilized area of the house with long hours of operation. By 2009, as CFLs were becoming more accepted, customers installed them throughout the house, including less brightly lit, lower hours of operation areas such as hallways and closets.

Energy Division used the results from the Final Evaluation Report: Upstream Lighting Program which was fielded in 2009, in the Evaluation Reporting Tool for all years, inappropriately assuming that consumers' installation patterns were identical in 2006, 2007, 2008 and 2009.[76/] A more appropriate assumption would be that the *ex-ante* values adequately reflected installation practices prior to the 2006 program. These *ex-ante* unit energy savings numbers were largely confirmed by the ex-post lighting evaluation of the 2004-2005 portfolio.[77/] If the 2009 *ex-post* study approximately reflected installation practices in 2009, then one could estimate a trajectory over the course of 2006 – 2009 from the earlier patterns (which resulted in higher savings per bulb installed) to the later patterns (which resulted in lower savings per bulb.) In other words, the bulbs saved more energy per bulb when installed in predominately high use areas such as kitchens in 2006 than they saved when installed throughout the home in 2009.[78/]

76/ Attachment A to comments on the Draft Evaluation Report: Upstream Lighting Program (filed Jan. 7, 2010), attached to: *Comments of PG&E and SCE on the Assigned Commissioner's Ruling Providing Energy Division Report And Soliciting Comments On Scenario Runs* (filed Jan. 29, 2009), p. 263.

77/ Itron, et. al. "2004/2005 Statewide Residential Retrofit Single-Family Energy Efficiency Rebate Evaluation" (Oct. 2, 2007).

78/ The Commission and PG&E subsequently collaborated to understand the differences between PG&E's ex-ante claimed gross savings and the Commission's ex-post net savings for the 2006-2008 period. In that analysis, the "Application of 2009 CFL Unit Energy Savings (UES) to All CFLs" was identified as a "green" reduction from the reported net savings; this indicates that from the Commission staff perspective, the savings was indeed realized by society. "CPUC & PG&E Analysis of Reported Versus Evaluated Savings Results for PG&E's 2006 to 2008 Energy Efficiency Portfolio" Final Assessment, March 6, 2015 (Notice of Availability, Attachment 7).

PG&E recalculated the gross first year savings and PEB calculations using ex ante values for 2006, interpolated values for 2007 (the average of the *ex-ante* 2006 and *ex-post* 2008 values) and *ex-post* values for 2008. This is a more reasonable approach given the change in usage patterns during this period.

(3) Incremental Measure Costs Were Overstated.

The Incremental Measure Cost (IMC) is the difference between the cost of the CFL and the cost of a comparable lumen output incandescent bulb. The method used to determine the IMC of a CFL used in the 2006-2008 performance earnings basis calculation results in an inaccurate characterization of the incremental cost of CFLs. The method calculated the equipment and installation avoided costs that would have accrued for only one incandescent light bulb even though the effective useful life of a CFL is significantly longer than for an incandescent bulb. PG&E's proposal increases the baseline cost of using incandescent bulbs to account for the multiple incandescent bulbs and their installation that would have been required in the absence of the CFL. This lowers the IMC and increases the TRC net benefits and PEB.

The method used to determine the IMC significantly overstates the true incremental cost because the method counts the baseline costs of only one incandescent bulb, while the measure life for a CFL is significantly longer than for an incandescent bulb. First, the IMC methodology used includes the avoided equipment cost of only one incandescent bulb, thereby failing to account for the number of incandescent replacement bulbs required to match the effective useful life of a single CFL. Second, the installation labor cost of replacing the additional incandescent bulbs should also be accounted for. This installation labor cost is an operation/maintenance expense, which are required to be included in the TRC test.[79/] The methodology used understates TRC net benefits and therefore the PEB.

79/ California Standard Practice Manual, p. 18 (July 2002).

Peter Miller's reanalysis of the 2006-2008 Upstream Lighting Program "develop[ed] a more accurate and representative estimate of the impacts" of the Program.[80/] In describing incremental measure cost, Mr. Miller states:

> According to CPUC policy rules, total program costs from a societal perspective include the net incremental cost to program participants of the efficiency measures that are promoted through the program (i.e. CFLs). In estimating program costs, the ULP Evaluation Report failed to account for the cost savings from the incandescent lamps that participants avoided purchasing.[81/]

In his analysis, Mr. Miller concluded that accurately accounting for incremental measure costs lowers the total cost of the program[82/] and also results in increased net economic benefits from the program.[83/]

The CPUC Standard Practice Manual requires all that installation and maintenance costs associated with an energy efficiency program should be included in the TRC test.[84/] It states:

> The costs in this test are the program costs paid by both the utility and the participants plus the increase in supply costs for the periods in which load is increased. Thus all equipment costs, installation, operation and maintenance, cost of removal (less salvage value), and administration costs, no matter who pays for them, are included in this test.[85/]

The TRC net benefits must be recalculated for the Program, taking into account: (1) the costs for the full stream of avoided incandescent bulb replacements associated with the life of the program CFLs; and, (2) all installation and maintenance costs associated with bulb installations. PG&E recommends that the equipment costs of 5 incandescent bulbs be considered as the

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80/ Miller, Peter, Natural Resources Defense Council, *Reanalysis of the 2006-08 Upstream Lighting Program,* p. 1. (June 2011).

81/ *Id.*, p. 2.

82/ *Id.*, p. 7.

83/ *Id.*, p. 8.

84/ California Standard Practice Manual, Economic Analysis Of Demand-Side Programs And Projects, p. 18 (July 2002),

85/ *Id.,* p. 18.

baseline cost for determining the CFL IMC for residential customers. For non-residential customers, the equipment *and installation costs* of 5 incandescent bulbs should be considered as the baseline cost for determining the CFL IMC.

(4) The Split between Residential and Commercial Bulbs Is Unsupported.

The *ex-post* evaluation report incorrectly assumed that fewer CFLs were used in commercial buildings than PG&E had reported. This reduction of the portion of the CFLs used in commercial buildings reduced PG&E's total savings from CFLs because CFLs used in commercial buildings have higher operating hours and produce more energy savings. The EM&V report for the Upstream Lighting Program concluded that approximately 94% of the rebated lighting measures were found to have been installed in residential locations, as compared to the 90% residential *ex-ante* value.[86/] The Energy Division's consultant used three different methods to estimate the 90% residential *ex-post* residential/non-residential split, estimating that residential accounted for 92%, 93%, or 94% of the bulbs purchased depending on the method employed. Ultimately, Energy Division adopted a value of 94% residential,[87/] which reduced both first year energy savings and PEB net benefits. The three different methods that resulted in these results were: (1) in store intercept surveys; (2) CFL user surveys; and (3) residential and non-residential on-site surveys.[88/] The results of KEMA's evaluation are shown below:

86/ KEMA, et. al., *Final Evaluation Report: Upstream Lighting Program*, p. 57 (Feb. 8, 2010).

87/ *Id.,* p. 57.

88/ *Id.*, pp. 40-41.

PG&E Table 12
Results of KEMA Residential/Non-Residential Splits

Evaluation Method	Residential	Non-Residential
In Store Intercept Survey	93%	7%
CFL User Survey	92%	8%
Residential and Non-Residential On-Site Survey	94%	6%

KEMA claimed the residential and non-residential on-site survey method was the most appropriate method because it did not involve customer self-report.[89/] Self-report methods, while certainly subject to various biases, are used throughout the Commission's impact evaluations. It is inappropriate to ignore the In Store Intercept Survey and CFL User Survey results.

Given the uncertainties around the appropriate residential/non-residential splits, the averages of the three values – 93% residential and 7% non-residential – should be used. The net effect of this adjustment would be to increase first-year savings and PEB given that non-residential bulbs operate for more hours than residential bulbs.

(5) The Reports Contain Erroneous Assumptions About The Number of Installed CFLs Due To CFL Burnouts

The upstream CFL bulbs considered to be installed and generating first-year savings and PEB net benefits exclude incented CFLs that are deemed to have "burned out" even though the burnout bulbs may have reached the end of their average useful lives. Residential and non-residential customer surveys were used to determine how many program bulbs had burned out or were no longer installed. This information was used to reduce CFL bulb installation rates in the Commission's ERT model.[90/]

The removal of these bulbs from the ERT's calculation of energy savings and net benefits reduces savings and the PEB calculation. Removal of the bulbs completely negates any savings that occurred when the bulbs were operational. Given the timing of the customer surveys at the conclusion of the program cycle it is very likely that many bulbs generated savings for near to

89/ KEMA, et. al., *Upstream Lighting Program Evaluation Report, Volume 1*, p. 41 (Feb. 8, 2010).

90/ Table 21 shows a 7% burnout rate for PG&E non-residential bulbs. Table 20 shows a surviving installation rate of 61% which when subtracted from the 67% cumulative installation yields a 6% reduction in bulbs.

their expected useful life. The ERT completely removes savings from bulbs that were installed but burned out before the user surveys.[91/] The burned out non-residential bulbs should be added back to the share of installed bulbs for the purposes of the ERT calculations. This is a conservative request to only adjust the non-residential bulb credit since the reduction seems to be solely for burned out bulbs. There is less clarity regarding the residential bulbs and therefore PG&E is unable to recommend an appropriate adjustment for the burned out bulbs in residential buildings without further data and analysis.

(6) PG&E Should Receive Credit For All Bulbs Incented In 2006-2008 Regardless of the Installation Date.

Energy savings from CFLs were reduced in the net benefit calculations due to assumptions regarding the number of bulbs incentivized from 2006-2008 that were not installed until after 2008. This was consistent with an earlier Commission decision[92/] but is a practice that had many uncertainties and was later abandoned for the next portfolio period. As Energy Division later explained:

> In light of the complexities associated with modeling and tracking the vintage of and savings credit for stored lamps (an exercise that relies on assumptions about program market share *and burnout/early replacement rates that is not grounded in reliable data*), as well as the relatively short storage period observed in the field for stored bulbs, the 2010-2012 impact study evaluators have recommended a transition in accounting to credit program CFL bulb savings in the year in which the bulbs are sold.[93/]

Excluding bulbs purchased during the program period but installed in the following years results in an inaccurate assessment of program impacts and understates the actual program benefits.[94/] PG&E recommends that the net benefits for bulbs sold in 2006-2008 and installed in

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91/ The report also truncated savings for all remaining installed bulbs by ignoring the fact that some bulbs will last longer than the assumed average useful life.

92/ D. 05-04-051, OP 17, p. 96.

93/ California Public Utilities Commission, 2010-2012 Energy Efficiency Annual Progress Evaluation Report, p. Appendix K (March 2015) (emphasis added).

94/ The Evaluators' Protocol for impact assessment requires a report of all direct kWh, kw, and therm impacts associated with the program being evaluated regardless of the period incurred: The kWh,

2010 be discounted and included in the PEB for 2006-2008. Program net benefits should be correctly linked to the program expenditures that induced the customer actions. Requesting PEB credit for the bulbs sold in the 2006-2008 period and installed in 2010 is appropriate as the bulbs carried over in 2010-2012 were indisputably due to PG&E's 2006-2008 efforts and yet PG&E did not receive an incentive award for these significant energy savings.[95/]

Energy Division developed a model to track the vintage of bulbs sold, the number of bulbs installed, the number of bulbs stored for later use, and the timing of eventual installation. The model calculates a number of bulbs sold in 2006-2008 that are assumed to be installed in 2009 and 2010. The results from this model were published in a memorandum on CFL carry over bulbs (CFL Carry Over Memo).[96/] In the event that there is an opportunity for additional investigation, PG&E would request to review the carryover model and may adjust its alternate scenario.

PG&E requests corrections to the installation rate (Section IV.C.7.(5)), the share of installations in residential vs. non-residential facilities (Section IV.C.7.(4)), and the burnout rate for bulbs installed in non-residential facilities. These corrections adjust the number of bulbs installed in 2006-2008 and therefore the number of bulbs remaining to be installed in 2010, as shown in Table 13.

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kW and therm impacts are required to be reported separately for the first year and for each year thereafter for the period in which net program-induced savings are expected. TecMarket Works Team, *California Energy Efficiency Evaluation Protocols: Technical, Methodological and Reporting Requirements for Evaluation Professionals*, p. 24 (April 2006).

95/ The incentive mechanism during 2010-2012 was a management fee based exclusively on approved IOU expenditures during those years. See D.12-12-032, p. 48, OP 1.

96/ "10-12 CFL analysis 06-09 ULP CarryOver" spreadsheet embedded in the "Energy Division Guidance Regarding How to Report Upstream CFL Savings including Reporting of Carry Over from Program Years 2006-2009, and 2010-2012 Installation Rates" Memo (May 16, 2013).

PG&E Table 13
PG&E Proposed Timing of Credit for 2006 – 2008 Claimed Bulbs

Program Year (PY)	Claims Adjusted for Leakage / Verification[97/]	Adjusted Credit in 06-08 ERT[98/]	Credit in 09 Decision	Adjusted 06-08 Claims that Remain for 10-12
Total	50,349,662	32,175,100	14,861,533	3,313,029
Residential	46,825,185	29,521,875	14,318,807	2,984,504
Non-Residential	3,524,476	2,653,226	542,726	328,524

PG&E calculated the TRC and PAC net benefits of these bulbs carried over into 2010, then further discounted these to the 2006-2008 period using the approved discount rate. This approach to calculating net benefits from the carryover bulbs is conservative and would result in a credit for 35.5 million of the approximately 50 million bulbs claimed in 2006-2008.

The changes to the CFL assumptions in Section B.2 and in subsections **1** through **6** above were made together in the ERT input files for the residential and non-residential upstream lighting program. Therefore, the impact of this set of changes can be seen only in aggregate and the impact of each change is not individually observable in the ERT results files. These changes together would result in an additional 758.7 GWh savings, 117.9 MW savings, and -10.9 MMtherm savings. The PEB is increased by $305,216,001.

(7) The *Ex-Post* Evaluation Reports Include Unsupported Conclusions Regarding CFL Interactive Effects

The EM&V reports adjust savings because of CFL interactive effects. CFLs generate less heat than incandescent lightbulbs resulting in: (1) reduced cooling requirements during air conditioning season; and (2) increased heating requirements during heating season (also called negative therm interactive effects). The DEER database includes both heating and cooling interactive effects of efficient equipment replacement and the ERT employ DEER database

97/ Includes PG&E's adjustments of the split of bulbs between residential and non-residential facilities to a 93% / 7% split.

98/ Includes PG&E's adjustment of the residential / non-residential split as well as the correction of the 06-08 installed bulbs Adjustment Factor and the adjustment to the number of bulbs considered to have burned out.

values. The estimates of negative therm interactive effects in residential buildings may be overstated in the ERT model and, as a result, may have artificially reduced TRC and PAC net benefits and the PEB.

The estimates of residential negative therm interactive effects for PG&E CFLs assumed a 78% gas takeback factor[99/] (i.e., the percent of additional natural gas energy needed for heating relative to the electricity energy saved from an efficient lighting retrofit). With PG&E's generally mild climate (relative to much of the rest of the country), a residential heating season that runs only about five months of the year, and the fact that CFLs are also installed in non-conditioned spaces (exterior lights, garages, etc.), the 78% take back estimate appears high. Simulation modeling of negative therm interactive effects for much colder climes were comparable or lower than the average PG&E value – a gas takeback factor range of 65 – 89% for Canada and 41- 85% for New York state.[100/] These results bring into question the validity of the California results.

A NRDC study in 2011[101/] also questioned the magnitude of the negative therm interactive effects used to calculate therm goal attainment and PEB. The study notes that the assumption that there is an increase in heating needs after installing more efficient lighting was not supported in a 2010 field study:

> The field study (Bruner et al. [2010][102/]) included limitations, notably that all sample homes were low-income. However, there are various reasons why the interactive effect predicted in models may not be seen in the real world. Although we do not know the

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99/ $Gas\ takeback\ factor\ \% = \frac{Increase\ in\ Annual\ Whole\ Building\ Natural\ Gas\ Use}{Annual\ Lighting\ Electricity\ Savings * 0.03412 \frac{ccf}{kWh}}$ x 100%

100/ Parekh, A., M. C. Swinton, F. Szadkowski, M. Manning, 2005, "Benchmarking of Energy Savings Associated with Energy Efficient Lighting in Houses", National Research Council Canada. NRCC-50874.

101/ Heschong Mahone Group (for Natural Resources Defense Council), Investigation of Interactive Effects in Residential Buildings (June 2, 2011).

102/ Eric J. Brunner, Peter S. Ford, Mark A. McNulty, Mark A. Thayer, 2010. *Compact Fluorescent Lighting and Residential Natural Gas Consumption: Testing for Interactive Effects. Energy Policy*: 38, pp. 1288-1296.

> exact modeling assumptions used in the simulation studies cited here, most residential simulation models assume perfect mixing and direct furnace response. This means that the heat generated from a light bulb is immediately mixed into the volume of air in the house, immediately affects the air temperature, is directly seen by the thermostat, and directly affects the furnace operation. In the real world, many light bulbs are recessed in the ceiling or mounted at the ceiling, air is stratified and imperfectly mixed, thermostats are located in other parts of the house, and thermostat response is dampened by deadbands. All of these factors would keep the furnace from responding as the model assumes, and would avoid the extra gas consumption, or at least substantially reduce it. As stated by Brunner et al. (2010), 'It is an empirical question as to whether the heat differential between the incandescent and CFL bulb is large enough to actually trip a home's thermostat and thereby increase heating requirements.'

The IOUs also previously stated concerns that the interactive effects were not based on any field data or actual *ex-post* billing analysis.[103/]

PG&E has requested, but not received, the input and output files and explanatory documentation for the building simulation modelling employed in the creation of the negative therm interactive effects. Examination of the detailed modelling assumptions and results is necessary to see if assumptions comport with typical building configuration, consumption, and occupant behavior in PG&E's service area. While PG&E does not propose alternative values for negative therm interactive effects at this time, PG&E reserves its right to review data and offer alternative negative therm interactive effect values after the requested data is provided.

103/ *Comments of Pacific Gas and Electric Company and Southern California Edison Company on the Assigned Commissioner's Ruling Providing Energy Division Report And Soliciting Comments on Scenario Runs*, p. 9 (May 18, 2010).

b. Custom Fabrication, Process and Manufacturing Program Gross and Net Savings Should Be Adjusted, and Data Entry Error Corrected.[104/]

The Fabrication, Process and Manufacturing Contract Group (FAB) impact evaluation underestimated the gross and net savings of some custom projects. In addition, a data entry error in the ERT reduced natural gas therm savings by approximately 9.1 MMtherms for one project.

(1) Gross savings

The FAB impact evaluation was separated into three different categories of projects based on the magnitude of the savings claim: (1) Pump-off controllers (POCs)[105/], (2) Non-POC projects and (3) gas projects. Out of a total of 1,564 PG&E FAB projects, evaluators visited 133 sites (the sample) to verify installations and collect additional data to estimate *ex post* savings. The 2006-2008 evaluation report reduced total reported gross savings to just 49% for kWh, 46% for kW and 68% for gas projects. Because of these significant savings losses, PG&E engineers conducted a detailed review of 27 of the 133 total FAB projects, which included a review of PG&E's original project files and CPUC final site reports (FSR). Out of those 27 projects, engineers found errors in the *ex post* evaluation of 10 projects.

The primary types of errors found were: (1) Miscategorization of projects; (2) Incorrect baseline assumptions; and (3) Incorrect calculation of kW adjustment factors for Pump-off controllers (POCs).

Examples of each of these are provided in Table 13 below. Appendix B.4 explains these adjustment reasons in more detail.

104/ If there are hearings, additional discovery and collaborative discussions with the Commission staff and their consultants will be needed. PG&E reviewed project entries in the ERT input files and found what we believe to be errors that should also be remedied.

105/ POCs are an electricity-saving technology used in oil wells that optimize pumping duration.

PG&E Table 14:
Examples of Gross Savings Discrepancy Reasons in 2006-2008 FAB Projects

Miscategorization of projects	
PROJECT DESCRIPTION	**DISCREPANCY**
Customized Retrofit	Evaluators categorized this project as a "fuel switching" project and disallowed all savings estimates. However, the project involved waste heat recovery without fuel switching resulting in a reduction of gas consumption.
Refinery EE Program	The Final Site Report by evaluators reported no savings because they classified the project as maintenance/repair, which is ineligible for savings, when it was actually an eligible new construction project.
INCORRECT BASELINE ASSUMPTIONS	
Fabrication, Process and Heavy Industrial Manufacturing	In this new construction project, an uncoated 36" pipeline baseline was appropriately chosen in the *ex-ante* savings estimates, representing Industry Standard Practice ("ISP") at that time. In the ex post evaluation, an inappropriate baseline was chosen of coated 30" pipe, reducing savings.
Fabrication, Process and Heavy Industrial Manufacturing	The ex post evaluators set the baseline without adjusting for production. At low production rates, the equipment efficiency is reduced thereby increasing the baseline energy consumption.
INCORRECT CALCULATION OF KW ADJUSTMENT FACTORS FOR PUMP-OFF CONTROLLERS (POCS)	
Customized Retrofit	The gross and net kW and kWh savings estimates for 2006-2008 POCs were based on incorrect calculations of the kW adjustment factor.

Based on the observed discrepancies in the 10 projects, PG&E believes the *ex-post* ERT input file gross savings should be increased by: 4,551 kW, 37,433,758 kWh and 6,736,218 therms.

(2) Adjustments to FAB 2006-2008 Net Savings Estimates

PG&E reviewed the 2006-2008 FAB net savings analysis and found that the Net-to-Gross Ratio (NTGR) under-estimated net savings. The evaluation used surveys of 306 out of a total of 1,564 projects for PG&E. The report's NTGR estimates for PG&E were 60% for kWh, 59% for kW, and 31% for therms[106/]. These values correspond to free ridership estimates of 40% for kWh, 41% for kW, and 69% for therm projects.

There are two issues with the NTGR estimation methodology. The first is that the survey and scoring methodology are inherently flawed, and even when implemented carefully, the

106/ See 2006-2008 Evaluation Report for PG&E Fabrication, Process and Manufacturing Contract Group (FAB), Table 4-1, Table 4-2, pp. 1-4.

results are likely inaccurate. PG&E provided many comments on the draft survey, methods and the draft report[107/], but few changes were made.

The second issue is the report's NTGR estimates were supposed to be based on the average of three survey scores: 1) timing and selection, 2) program influence, and 3) no program.[108/] Upon reviewing the analysis, PG&E found that the *ex-post* evaluation dropped or altered scores in 63 of the 306 sample cases, which is inconsistent with the evaluation methodology. In all 63 cases, either top scores were dropped or scores were reduced by 50%.

PG&E recalculated the weighted average NTGR using all the scores for the 306 projects, taken from NOA, Appendix C.3, and found corrected NTGR of 68% for kWh, 71% for kW, and 46% for therms. (See NOA, Appendix B.3.2).

These translate into significant increases in net savings. Unfortunately, without availability of sample weights, PG&E is unable to extrapolate the 306 project sample NTGR to the population of FAB projects. As a result, PG&E adjusted net savings in the ERT input files for the 306 sampled custom projects, but no net savings changes were made to the other 1,258 FAB projects. As a result, this is a conservative adjustment. Additional information is needed to complete this analysis to expand the NTG estimates to the full population of projects.

(3) ERT Data Entry Error

A significant omission of more than 9 million therm savings from a PG&E project is missing from the Energy Division's analysis and should be added. A review of project savings estimates in the ERT input file indicated an omission of *ex post* savings for CPUC Project Site ID #B063. This project saved both electricity and gas by incentivizing the construction of a reverse osmosis water treatment plant that removed 350 feet of water from a heated reservoir,

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107/ See 2006-2008 Evaluation Report for PG&E Fabrication, Process and Manufacturing Contract Group, Appendix F, see Free Ridership, NTGR, and NTG Analysis comments and responses.

108/ See FAB Report, Section 3.7.2, pp. 3-25, 3-26.

saving gas. The ex post evaluation final site report showed gas savings of 9,128,462 therms, but this was not in the ERT input file. PG&E corrected the data entry error in the ERT input file.

D. The Commission Should Use Consistent Assumptions to Establish and Measure Progress Towards Goals.

PG&E also includes an illustrative analysis of its goals if they were recalibrated with the *ex-post* parameter values. The RRIM mechanism calculates goals using *ex-ante* values but measures achievements using *ex-post* values. In the unanimous 2009 decision, the Commission identified that it is reasonable to use consistent assumptions to establish and then measure performance towards the goals:

> Comparing utility results that reflect updated estimates and assumptions with Commission goals that do not reflect those same updates and assumptions appears to be an apples to oranges comparison. … [I]t is reasonable … to compare … goals with the results that reflect the same underlying assumptions used in establishing those goals.[109/]

PG&E presents below a supplemental analysis, which uses the *ex-post* results to recalculate the goals, and analyzes the savings achievements assigned to PG&E's under the SAR Scenario 71 against such recalibrated goals. This produces something more akin to an apples-to-apples comparison, which is a fairer means to determine progress towards goals.

The goals recalibration aims to estimate what goals would have been, had updated assumptions from the Evaluation Report and changes that took place mid-cycle been incorporated at the outset. PG&E's analysis indicates that significant changes would have been made to all three goals (GWhs, MW, and MMtherms) as a result of three simple changes: the peak-to-energy ratio that was used to set the MW goal, negative therm interactive effects that were incorporated mid-cycle and are discussed above in Section IV.C.3, and NTG ratios that were used to establish goals on a net basis. As can be seen in the following table, GWhs, MW, and MMTherms would have been adjusted to 64%, 60%, and 37% respectively of the original

109/ D.09-12-045, p. 68.

and on a performance basis PG&E would have achieved 110%, 105%, and 207% respectively of the goals (if measured on a cumulative basis for 2004-08; a 2006-08 scenario is also included). Detailed analysis and results are provided in the following section.

PG&E Table 15
2004-2008 Scenario

A	b	C	D	e	f	g	h
	Original goals	Peak to energy ratio adjustment	Interactive effects adjustment	NTG ratio adjustment	Recalibrated as a % of original	SAR Scenario 7.1 Savings achievement	Performance as a % of recalibrated goals
GWhs	4,313.0	4,313.0	4,313.0	2769.9	64%	3,045.5	110%
MWs	936.0	830.6	830.6	558.3	60%	587.9	105%
MMTherms	64.4	64.4	47.7	23.7	37%	49.2	207%

PG&E Table 16
2006-2008 Scenario

A	B	c	d	e	f	g	h
	Original goals	Peak to energy ratio adjustment	Interactive effects adjustment	NTG ratio adjustment	Recalibrated as a % of original	Savings achievement	Performance as a % of recalibrated goals
GWhs	2,826.0	2,826.0	2,826.0	1814.9	64%	2,047.4	113%
MWs	613.0	512.1	512.1	344.2	56%	375.5	109%
MMTherms	44.8	44.8	33.2	16.5	37%	29.9	181%

The 2004-2008 goals were developed in 2002-2003, using data from the 1990s and early 2000s. While this was the best available data at the time, it later became apparent that there were big differences between the underlying assumptions that were the basis for the goals and the evaluated results of program activities in those years. These included: peak-to-energy ratios, unit energy savings, NTG ratios, among others. This exercise aims to set goals on a comparable basis to how programs were evaluated by using updated underlying assumptions from 2006-08 evaluation results.[110/]

110/ Commissioner Grueneich agreed that "the utilities have argued, with some reason, that in updating the assumptions underlying the goals, we moved the goal posts mid-kick." (Concurrence of Commissioner Grueneich to D. 09-12-045.)

The inputs for setting goals (the peak-to-energy ratio and net-to-gross ratios) were not well studied when the goals studies were conducted in 2002-03. The result was overly optimistic assumptions. In addition to the interactive effect adjustments discussed in Section IV.C.3 above, the two large discrepancies are:

- Peak-to-energy ratio: The 2006-08 peak (MW) goal was set using the peak-to-energy ratio from the IOUs 2004-05 portfolio applications. This was because there was a lack of load shape data to develop rigorous peak values at the time. This is exemplified by the lack of peak data in DEER 2001. Actual results from 2006-08 yielded a significantly lower peak-to-energy ratio, resulting in a goal for PG&E that was 100 MW or 20% greater than it should have been. PG&E believes the peak goal should be updated using the same peak-to-energy approach with the ex post values; it isn't useful to penalize the IOUs for an imperfect decision for which we now have better data.

- NTG ratios: The 2006-08 goals were set on a net basis, but the net savings projections relied on overly optimistic assumptions about the level of free ridership in IOU programs. NTG ratios ranged from 0.92-0.94 for GWhs, MW, and MMTherms.[111/] In other words, only 6-8% of participants in the program would have adopted the EE product in the absence of the programs. The 2006-08 evaluation results showed that these estimates were much too high. Evaluated NTG ratios were actually in the range of 0.47-0.62. This means that the values used to set goals were 50-100% greater than they should have been on a net basis. This discrepancy was acknowledged by the Commission in D.08-07-047 when it established future goals to be on a gross rather than a net basis.[112/]

PG&E requests that the goals be updated to reflect the changes as described above and outlined in the following tables.[113/]

111/ This was derived by estimating the naturally occurring levels from Figures 3-5, 3-7, and 3-23 in the Secret Surplus Study and comparing them to the max efficiency levels in table 3-1 of that study (the levels determined to be reasonable in D.04-09-060, page 9). The Secret Surplus Study did not include gas potential. The Commercial Gas Potential Study and Residential Potential Study were consulted for net to gross values in those studies. The following table summarizes the implied net to gross values for GWhs, MWs, and MMTherms for PG&E:

	Naturally Occurring	**Max Efficiency**	**Net to gross ratio**
GWhs*	2500	30090	0.92
MWs*	425	5902	0.93
MMTherms**	25	450	0.94

112/ D.08-07-047, pp. 28-29.

113/ The following sources were used for PG&E's analysis:

- Rufo, Michael, and Fred Coito, "California's Secret Energy Surplus: The Potential for Energy

PG&E Table 17
2004-2008 Scenario

	Original goals	Peak to energy ratio adjustment	Interactive effects adjustment	NTG ratio adjustment	Recalibrated as a % of original	Savings achievement	Performance as a % of recalibrated goals
GWhs	4,313.0	4,313.0	4,313.0	2769.9	64%	3,056.2	110%
MWs	936.0	830.6	830.6	558.3	60%	530.6	95%
MM Therms	64.4	64.4	47.7	23.7	37%	26.3	111%

If the goals are recalibrated as shown above and the adjustments and correction in PG&E's alternate analysis are included, PG&E's earnings would be approximately $120 million and the average goal performance rate would be 106%.

PG&E Table 18
2006-2008 Scenario

	Original goals	Peak to energy ratio adjustment	Interactive effects adjustment	NTG ratio adjustment	Recalibrated as a % of original	Savings achievement	Performance as a % of recalibrated goals
GWhs	2,826.0	2,826.0	2,826.0	1814.9	64%	2,047.4	113%
MWs	613.0	512.1	512.1	344.2	56%	375.5	109%
MM Therms	44.8	44.8	33.2	16.5	37%	29.9	181%

Did the Energy Division's "2006-2008 Energy Efficiency Evaluation Report" or a scenario in the "2006-2008 Energy Division Scenario Analysis Report" correctly implement the relevant directives of the Commission? Are there additional relevant documents in which Energy Division has verified calculations that implement these directives?

Efficiency," Xenergy Inc., funded by Hewlett Foundation, September 23, 2002 (hereinafter: "Secret Surplus Study"). This study was the basis for the goals set in D.04-09-060.

- Rufo, Michael, and Fred Coito, "California Statewide Commercial Sector Energy Efficiency Potential Study," volumes 1 and 2, Xenergy Inc., July 9, 2002 (hereinafter: "2002 Commercial Potential Study"). This study informed the Secret Surplus Study.
- Rufo, Michael, and Fred Coito, "California Statewide Commercial Sector Natural Gas Energy Efficiency Potential Study," volumes 1 and 2, Xenergy Inc., May 14, 2003 (hereinafter: "2003 Commercial Gas Potential Study"). This study informed gas goals set in D.04-09-060.
- Rufo, Michael, and Fred Coito, "California Statewide Residential Sector Energy Efficiency Potential Study," volumes 1 and 2, Xenergy Inc., April, 2003 (hereinafter: "2003 Residential Potential Study"). This study informed the Secret Surplus Study.

V. PG&E'S RESPONSE TO THE SCOPING MEMO QUESTIONS.

A. The Evaluation Report and Scenario Analysis Report Did Not Correctly Implement Commission Directives.

The first question in the Amended Scoping Memo[114/] is:

Neither the Evaluation Report nor the Scenario Analysis Report correctly implemented the relevant directives of the Commission, because neither verified calculations that implement these directives. The Evaluation Report contains significant errors and unverifiable conclusions based on the *ex-post* reports. As such, D.10-12-049 correctly did not rely on these studies to calculate the final true-up payment. Furthermore, there are no additional documents in which ED verified calculations that implemented the relevant Commission directives around program impact evaluations. Of all the various scenarios in the SAR, Scenario 3, which calculates the IOUs' awards based on the *ex-ante* savings values produces a result which is most consistent with the intent of the Commission in approving the RRIM.

B. The Incentive Awards for 2006-2008 Are Just and Reasonable.

Decision 15-09-026 requires the Commission to review whether the incentive awards for 2006-2008 are "just and reasonable"[115/] The Amended Scoping Memo, question 2 asks:

> Are incentive payments based on the calculations in the Energy Division's "2006-2008 Energy Efficiency Evaluation Report," a scenario in the "2006-2008 Energy Division Scenario Analysis Report," or other document identified in response to Question 1, just and reasonable? If not, how and why should they be adjusted to a just and reasonable level?

PG&E's analysis above indicates that its award was just and reasonable. A comparison of the total awards to the average range of shareholder incentives paid to other utilities in the nation indicates that the amounts of the awards are reasonable.

The total incentive awards to the IOUs, "[b]ased on the total EE budget for 2006-08 of $2.2 billion . . . represent an equivalent fee of approximately 9.63% of EE expenditures."[116/]

114/ Amended Scoping Memo, p. 3 (Jan. 22, 2016).

115/ D.15-09-026, p. 13, O P 6; Scoping Memo, p. 3, issue 2.

116/ D.12-12-032, p. 27.

PG&E's total shareholder incentive in the 2006-08 program cycle was approximately 11.3% of audited energy efficiency expenditures, as shown in Table 19 below.

PG&E Table 19
2006-08 Audited Expenditures vs. RRIM Award[117/]
($ million)

Description	2006	2007	2008	Total
Actual Expenditures	$ 142,232	$ 298,065	$ 480,634	$ 920,931
RRIM Award	$ 41,500	$ 33,431	$ 29,115	$ 104,046
% Award vs Spend	29.2%	11.2%	6.1%	11.3%

Two studies of the American Council for an Energy Efficiency Economy (ACEEE) regarding utility shareholder earning amounts across the United States, the first of which cited in multiple Commission decisions,[118/] indicate that PG&E's 2006-08 shareholder incentive falls within the average incentive earned across the country. In 2011, ACEEE research found that incentive earnings ranged from 5-20% of program spending across the United States, and that the average shareholder incentive was 10-11% of program spending.[119/] As of May 2015, the average shareholder incentive as a percentage of energy efficiency spending increased to 16.75% across the country, and 9% for savings-based earnings mechanisms (which is the type of mechanism in place in California for the 2006-08 cycle).[120/]

The Commission relied on one of the ACEEE studies when it approved the current shareholder incentive mechanism, the Efficiency Savings and Performance Incentive Mechanism (ESPI). The Commission found that 10.85% of energy efficiency portfolio budget is a just and reasonable earnings amount for California's shareholder incentives as it was within the range of earnings offered by other states.[121/] It concluded that an award of approximately 11 % of budget

117/ This table includes 2006-2008 Program Actual Expenditures, excluding EM&V, and is from Table 1 of PG&E's 2008 EE Audit (Nov. 2, 2009).

118/ D.12-12-032, p. 27; D.13-09-023, p. 27.

119/ *Carrots,* (Jan 2011).

120/ *Beyond Carrots* (May 2015).

121/ D.13-09-023, p. 27.

was "an appropriate level of incentives." In addition, the ACEEE studies found that when incentives are available, most utilities have earned at the high end of the range, where, as here, the programs are well-established. For more mature portfolios, utilities have consistently earned close to the maximum incentive available.[122/] Thus, the amount of the incentive award -- 11.3% of 2006-08 EE spending verified by the CPUC auditors[123/] -- is just as reasonable as compared to utility shareholder earnings across the country.[124/]

C. Any Refunds Or Penalties Owed By A Utility Would Be Deducted From Future Earnings Claims.

The third question in the Amended Scoping Memo is: "If the just and reasonable incentive payments determined in Question 2 require a refund, how should that refund be implemented?"[125/] Two prior Commission decisions on the RRIM mandate that any refund would be an offset to future shareholder incentive earnings, rather than be handled as a refund, so that the IOUs would be able to book the interim shareholder incentive awards.

In Decision 07-09-043, the Commission recognized that it would be problematic for the IOUs to continue to be obligated to refund prior earnings as they would not be able to book the two interim payments as earnings. It decided that any refunds of earnings previously distributed would be deducted from future earnings claims.[126/] The Commission stated: "Any pay-back obligations that might arise in the final true-up claim should be booked against positive earnings in the next energy efficiency program cycle, and not be consolidated with other electric distribution or gas transportation rate changes for the next scheduled change."[127/] This rule was

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122/ *Carrots* (Jan. 2011).

123/ In the three final Financial, Management, and Compliance Audits reports of PG&E's Energy Efficiency Programs for 2006-2008, the Commission audit branch determined that PG&E complied with Commission requirements and directives in implementing energy efficiency programs for areas audited and that PG&E's expenditures were appropriate.

124/ A comparison of the awards to similar portfolio awards are "new facts" that could be considered consistent with Public Utilities Code Section 1736.

125/ Amended Scoping Memo, p. 3, question 3.

126/ D.07-09-043, p. 124; p. 204, FOF 110.

127/ *Id.*, p. 218, COL 16; see also p. 126; p. 217, COL 8..

reaffirmed in the next RRIM decision which reiterated that the IOUs would deduct "from future earnings claims any over-collections and associated penalties if the utilities fall into the penalty range on an ex-post basis."[128/]

Refunds should not be required. However, if the Commission disagrees and determines that refunds are necessary, the approved refund process should be followed. Under the ESPI mechanism, the Commission requires the IOUs to file two annual advice letters to request their shareholder incentive awards.[129/] If a refund of any amount is required, the IOUs should return any portions of the 2006-2008 earnings by offsetting the amount of the award in the next applicable shareholder incentive advice letter(s).

VI. CONCLUSION

PG&E appreciates the opportunity to provide this proposal to resolve the issues in the scope of this proceeding. For the reasons discussed herein, the Commission should decline to recalculate 2006-2008 awards under a mechanism now largely discredited, using *ex post* data that has been shown to contain serious errors, unconfirmed assumptions, and biases in the evaluation of savings achieved by the 2006-2008 programs. Instead, the Commission should base its decision, as it did in 2010, on Scenario 3, which uses *ex-ante* data and comes closest to correctly implementing Commission directives to award earnings given the various unresolved controversies related to the EM&V results.

PG&E requests the Commission to re-affirm its 2006-2008 awards based on the *ex-ante* data and again conclude that PG&E's award for the 2006-2008 period is just and reasonable.

128/ D.08-01-042, p. 26, OP 2, modifying D.07-09-043; p. 204, FOF 110.

129/ D. 13-09-023, OPs 4, 5.

Respectfully Submitted,

By: */s/ Mary A. Gandesbery*
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PACIFIC GAS AND ELECTRIC COMPANY

Dated: March 18, 2016

Attachment 1 – PG&E Scenario Results

Table A.1
Summary Of PG&E Scenario Results
Errors and Omissions Scenario
Pacific Gas and Electric Company

Savings Goals (2006 - 2008 only, IOU scenario does not include cumulative savings from 2004 - 2005)	
Total Savings Goal (GWH)	4,313.0
Total Peak Savings Goal (MW)	936.0
Total Natural Gas Savings Goal (MMTh)	64.4
MPS Goals (80% of goal)	
Total Savings Goal (GWH)	3,450.4
Total Peak Savings Goal (MW)	748.8
Total Natural Gas Savings Goal (MMTh)	51.5
Dead Band (65% of goal)	
Total Savings Goal (GWH)	2,803.5
Total Peak Savings Goal (MW)	608.4
Total Natural Gas Savings Goal (MMTh)	41.9

Achieved Savings Towards MPS	
EE Portfolio Savings (adjusted ex-ante)	
Total Savings Goal (GWH)	1,765.9
Total Peak Savings Goal (MW)	320.0
Total Natural Gas Savings Goal (MMTh)	22.3
50% C&S Savings (adjusted ex-ante)	
Total Savings Goal (GWH)	157.9
Total Peak Savings Goal (MW)	30.6
Total Natural Gas Savings Goal (MMTh)	2.2
04-05 EM&V Adjusted EE Portfolio Savings	
Total Savings Goal (GWH)	998.2
Total Peak Savings Goal (MW)	212.3
Total Natural Gas Savings Goal (MMTh)	19.1
EM&V Adjusted LIEE Savings	
Total Savings Goal (GWH)	127.6
Total Peak Savings Goal (MW)	25.8
Total Natural Gas Savings Goal (MMTh)	5.7
Scenario Adjustment	
C&S - 2008 Savings new standards	
Total Savings Goal (GWH)	105.0
Total Peak Savings Goal (MW)	11.3
Total Natural Gas Savings Goal (MMTh)	(0.5)
Correct '04-'05 EM&V adjusted savings (incorrect transcription)	
Total Savings Goal (GWH)	13.4
Total Peak Savings Goal (MW)	4.5
Total Natural Gas Savings Goal (MMTh)	
CFL ISR - Correct reference error	
Total Savings Goal (GWH)	28.3
Total Peak Savings Goal (MW)	3.9
Total Natural Gas Savings Goal (MMTh)	(0.5)
Omitted Workforce Education & Training Program	
Total Savings Goal (GWH)	2.3
Total Peak Savings Goal (MW)	0.6
Total Natural Gas Savings Goal (MMTh)	
Total Achieved Savings Toward MPS	
Total Savings Goal (GWH)	3,198.6
Total Peak Savings Goal (MW)	609.0
Total Natural Gas Savings Goal (MMTh)	48.2

MPS Individual Metric Performance	
Percent of GWH Goal	74.2%
Percent of MW Goal	65.1%
Percent of MMTh Goal	74.9%
MPS Average Metric Performance	71%

Table A.2
Summary Of PG&E Scenario Results
Scenario 7b
Pacific Gas and Electric Company

Savings Goals (2006 - 2008 only, IOU scenario does not include cumulative savings from 2004 - 2005)	
Total Savings Goal (GWH)	2,826.0
Total Peak Savings Goal (MW)	613.0
Total Natural Gas Savings Goal (MMTh)	33.2
MPS Goals (80% of goal)	
Total Savings Goal (GWH)	2,260.8
Total Peak Savings Goal (MW)	490.4
Total Natural Gas Savings Goal (MMTh)	26.6
Dead Band (65% of goal)	
Total Savings Goal (GWH)	1,836.9
Total Peak Savings Goal (MW)	398.5
Total Natural Gas Savings Goal (MMTh)	21.6

Achieved Savings Towards MPS	
EE Portfolio Savings (adjusted ex-ante)	
Total Savings Goal (GWH)	1,765.9
Total Peak Savings Goal (MW)	320.0
Total Natural Gas Savings Goal (MMTh)	22.3
Scenario Adjustment	
100% C&S Savings (Increased from 50% as proposed in Scenario 7b)	
Total Savings Goal (GWH)	315.8
Total Peak Savings Goal (MW)	61.2
Total Natural Gas Savings Goal (MMTh)	4.4
04-05 EM&V Adjusted EE Portfolio Savings (Removed as proposed in Scenario 7b)	
Total Savings Goal (GWH)	0.0
Total Peak Savings Goal (MW)	0.0
Total Natural Gas Savings Goal (MMTh)	0.0
EM&V Adjusted LIEE Savings (PY 2006 - 2008) (Corrected)	
Total Savings Goal (GWH)	82.8
Total Peak Savings Goal (MW)	17.0
Total Natural Gas Savings Goal (MMTh)	3.8
C&S - 2008 Savings New Standards	
Total Savings Goal (GWH)	105.0
Total Peak Savings Goal (MW)	11.3
Total Natural Gas Savings Goal (MMTh)	(0.5)
Combined CFL Program Adjustments	
Total Savings Goal (GWH)	758.7
Total Peak Savings Goal (MW)	117.9
Total Natural Gas Savings Goal (MMTh)	(10.9)
Combined Custom Projects Adjustments	
Total Savings Goal (GWH)	28.0
Total Peak Savings Goal (MW)	3.1
Total Natural Gas Savings Goal (MMTh)	7.2
Total Achieved Savings Toward MPS	
Total Savings Goal (GWH)	3,056.2
Total Peak Savings Goal (MW)	530.6
Total Natural Gas Savings Goal (MMTh)	26.3

MPS Individual Metric Performance	
Percent of GWH Goal	108.1%
Percent of MW Goal	86.5%
Percent of MMTh Goal	79.3%
MPS Average Metric Performance	91.3%

Performance Earnings Basis (PEB)	
Original PEB Assumption/Calculation	
TRC Net Benefits	$ 183,655,686
PAC Net Benefits	$ 400,647,951
PEB	$ 255,986,441
PEB Scenario Adjustment	
TRC Net Benefits	$ 769,570,746
PAC Net Benefits	$ 685,301,942
Issues Affecting PEB	
C&S - 2008 Savings New Standards	$ 29,734,771
CFL Carryover Beyond 2008	$ 28,283,186
CFL: Combination	$ 305,216,000
Custom Fab Projects: Combination	$ 74,221,710
Carbon value	$ 165,012,709
Renewable Portfolio Standard (RPS)	$ 98,223,584
Net Present Value (NPV) Adjustment	$ 40,789,195
Total Achieved Benefits	
TRC Net Benefits	$ 953,226,432
PAC Net Benefits	$ 1,085,949,893
PEB	$ 997,467,597

Earnings/Penalty Cap	$ 180,000,000
Earnings Rate (IOU Scenario)	9%
Total Earnings	$ 89,772,083.77
Penalties	No
Total Penalties	No Penalty

Attachment 2 – Summary of Modifications to Implement PG&E Scenarios

Attachment 2 – Summary of Modifications to Implement PG&E Scenarios

Issue	SAR Scenarios Impacted	Section	Applicable PG&E Scenarios	Related Attachment or Appendix	Explanation of Issue
[A]	**[B]**	**[C]**	**[D]**		**[E]**
Correct '04-'05 EM&V adjusted savings (incorrect transcription)	Sc. 2 - 7	IV.B.1	7a	Appendix A Table A.7	The SAR identifies the 2004-2005 ex-post evaluation results from the Verification Report. These results match the figures in the Energy Efficiency 2006-2007 Verification Report but the data in the excel templates used to calculate the awards contain errors.
CFL ISR - Correct reference error	Sc. 4 - 9	IV.B.2	7a, 7b	Appendix B Table B.2.1	KEMA, Inc. concluded that approximately 12% of PG&E's upstream CFLs incented in 2008 were not sold until 2009. The 12% reduction was inadvertently applied to bulbs incented in 2006 and 2007 in the ERT. This resulted in an undercounting of installed CFLs for 2006-2007.
C&S - 2008 Savings new standards	All	IV.B.3	7a, 7b	Attachment 4	The SAR calculations do not currently reflect any savings or net benefits associated with the standards arising from codes and standards (C&S) advocacy activity initiated within the 2006-2008 program cycle.
Low Income Energy Efficiency Data	All	IV.B.4	7a, 7b	Appendix A Table A.5, A.6	There is a transcription error in the 2008 GWh energy achievements. Applying the stated CPUC methodology for determining demand from the average of the '06-07 demand to energy ratio also adjusts the 2008 MW demand achievements.
C&S - Counting of pre-2006 standards	All	IV.C.1	7b		The Commission's policy rules for energy efficiency originally only allowed the IOUs to count 50% of the 2006-008 savings from pre-2006 Codes and Standards (C&S) advocacy activity towards achievement of goals based on concerns about how the savings would be counted. However, because the Commission decided the counting issue was resolved before the True Up Decision was issued, all C&S savings should have been counted.
Goals - Exclude 2004 - 2005 Program Cycle	Sc. 2-7	IV.C.2	7b	Appendix A Table A.7	In D.09-12-045, the Commission concluded that "[f]or the purposes of measuring interim incentive earnings for the 2006-2008 cycle, we agree that it is appropriate to exclude the effects of cumulative goals starting from 2004, as reflected in the Verification Report." The cumulative effects of the 2004-2005 program cycle should be excluded here.

Goals - adjust 2006-08 Goals for interactive effects	Sc. 5, 7, 9	IV.C.3	7b	Appendix A Table A.7	Decision 09-05-037 reduced PG&E's therm goal by 26% for years 2009-2011 to account for interactive effects that were not included in the goals studies that informed the 2004 goals decision. Decision 09-12-045 reduced PG&E's therm goals for the same reason. The reduction should be again approved, using the 26% reduction of PG&E's therm goal approved in D.09-05-037.
Net Present Value (NPV) Adjustment	All	IV.C.4	7b	Appendix A Table A.8, A.9	The cost effectiveness calculator appropriately discounts the future incentive costs as well as the future stream of benefits accruing due to energy efficiency activities occurring during the program period. However, the calculator does not have the functionality needed to discount the non-incentive costs. To remedy this error, PG&E applied the known discount rate of 7.49% as present in the E3 calculator to the second and third year of the non-incentive costs.
Carbon value	All	IV.C.5	7b	Appendix B.1	The avoided cost of GHG should have been $30 per ton based on the 2008 Market Price Referent (MPR). The ERT used an E3 cost-effectiveness calculator with an embedded price of carbon that escalates from $9 - $22 per ton.
Renewable Portfolio Standard (RPS)	All	IV.C.6	7b	Appendix B.1	An avoided RPS cost premium has been included in more recent E3 calculators in recognition that the procurement cost of RPS-eligible energy and capacity was typically higher than the procurement cost of conventional energy and capacity. In this scenario, PG&E added a renewable cost premium to the avoided costs embedded in the E3 cost effectiveness calculator to better represent the costs avoided by PG&E's 2006-2008 portfolio.
CFL Net to Gross (NTG)	Sc. 6 - 9	IV.C.7.a (1)	7b	Attachment 6	The net-to-gross ratio (NTG) adjustments for the Upstream Lighting Program calculations are unreasonably low and unfairly reduce first year net savings and PEB net benefits. The Commission should instead use the *ex-ante* values used to operate the 2006-2008 portfolio.

CFL Unit Energy Savings (UES)	Sc. 4 - 9	IV.C.7.a (2)	7b	Attachment 5, Appendix B.2.2	The Energy Division used 2009 data from field studies for the entire 2006-2008 period. The Energy Division should have used earlier data for the 2006-2007 period as customer usage patterns for these bulbs changed during the three-year period. Using 2009 UES values for the entire 2006 to 2008 results in lower gross first year savings and downward biased PEB net benefits for the program cycle.
CFL Incremental Measure Cost (IMC)	All	IV.C.7.a (3)	7b	Attachment 6, Appendix B.2.3	The method used to determine the incremental measure cost (IMC) of a CFL calculated the equipment and installation avoided costs that would have accrued for only one incandescent light bulb even though the effective useful life of a CFL is significantly longer than for an incandescent bulb. PG&E's analysis increases the baseline cost of using incandescent bulbs to account for the multiple incandescent bulbs and their installation that would have been required in the absence of the CFL.
CFL Residential bulbs/Non-Residential bulbs ratio	Sc. 4 - 9	IV.C.7.a (4)	7b		The Energy Division's consultant used three different methods to estimate the share of upstream CFLs installed in residential vs. non-residential facilities, estimating that residential accounted for 92%, 93%, or 94% of the bulbs purchased depending on the method employed. Energy Division adopted a value of 94% residential, which reduced both first year energy savings and PEB net benefits. Given the uncertainties around the appropriate residential/non-residential splits, the averages of the three values – 93% residential and 7% non-residential – should be used.
CFL ISR accounting for non-residential burnout bulbs	Sc. 4 - 9	IV.C.7.a (5)	7b	Appendix B.2.1	The upstream CFL bulbs considered to be installed and generating first-year savings and PEB net benefits exclude incented CFLs that are deemed to have "burned out" even though the burnout bulbs may have reached the end of their average useful lives. The burned out non-residential bulbs should be added back to the share of installed bulbs for the purposes of the ERT calculations.
CFL Carryover beyond 2008		IV.C.7.a (6)	7b	Appendix B.2.4	Excluding CFLs purchased during the program period but installed in the following years results in an inaccurate assessment of program impacts and understates the actual program benefits. The net benefits for bulbs sold in 2006-2008 and installed in 2010 should be discounted and included in the PEB for 2006-2008.
Custom 2006 - 2008 Gross Savings	Sc. 4 - 9	IV.C.7. b(1)	7b	Appendix B.3.3, B.4	Out of a total of 1,564 PG&E FAB projects, evaluators visited 133 sites. The 2006-2008 evaluation reduced total gross savings by 49% for kWh, 46% for kW and 68% for gas projects. PG&E engineers conducted a detailed review of 27 of the 133 total FAB projects, which included a review of PG&E's original project files and CPUC final site reports (FSR). Out of those 27 projects, engineers found errors in the ex post evaluation of 10 projects.

Custom 2006 - 2008 NTG ratio	Sc. 4 - 9	IV.C.7. b(2)	7b	Appendix B.3.2	There are two issues with the NTGR estimation methodology. The first is that the survey and scoring methodology are inherently flawed, and even when implemented carefully, the results are likely inaccurate. The second issue is the report's NTGR estimates were supposed to be based on the average of three survey scores. The three scores should have been averaged, rather than the top score dropped, which happened in several instances. PG&E recalculated the weighted average NTGR using all the scores to determine a corrected NTGR.
Custom Fab: Standalone Oil and Gas Project ERT Data Entry Error	Sc. 4-9	IV.C.7. b(3)	7b	Appendix B.3.1	There is an omission of ex post savings for CPUC Project Site ID #B063. The ex post evaluation final site report showed gas savings of 9,128,462 therms, but this was not in the ERT input file.
Goals - Recalibrate based on ex-post information	All	IV.D	7c	Appendix B.5	The RRIM mechanism calculates goals using ex-ante values but measures achievements using ex-post values. PG&E presents a supplemental analysis, which uses the ex-post results to recalculate the goals, and analyzes the savings achievements assigned to PG&E's under the SAR Scenario 7-1 against such recalibrated goals. This produces something more akin to an apples-to-apples comparison, which is a fairer means to determine progress towards goals.

Attachment 3 –The Number of CFLs Sold in 2006-2007 Were Reduced by CFLs Sold In 2009

The following table calculates the corrected in service rate (ISR or "EDIrate") for non-residential CFL installations.

PG&E Table 4-1
Erroneous and Corrected Calculation of Non-residential CFL In Service Rate (ISR)

		Calculation of ISR using Erroneous Values from ULP report	Corrected Calculation of ISR	Information Source
A	Invoice / Application Verification	0.961	0.961	ULP Table 50, p. 103
B	2008 Shipments Sold in 2008 / 2006-2008 Shipments Sold in 2006-2008	0.88	0.941	ULP Table 14, p. 39
C	Leakage	0.9955	0.9955	ULP Table 15, p. 39
D	Final Adjustments to Quantity of Measures Rebated = [A * B * C]	0.86	0.90	ULP Table 12, p. 36 / Calculated
E	Installation Rate	0.73	0.73	ULP Table 26, p. 57.
F	In Service Rate [EDIRate] = [D * E]	0.5762	0.6032	Calculated

The following table was provided in Appendix C of the 2006-2008 Evaluation Report, p. 157 to provide a reference for the source of information that was used in the ERT input files. For the installation rate, the reader is pointed to Tables 12 and 26 of the Upstream Lighting Program evaluation report.

Table 64 - PGE2000 Direct EM&V Updates for Lighting Measures

Measure Group	Downstream Lighting	Upstream Lighting - CFLS	Upstream Lighting - LEDs	Upstream Lighting - Fixtures
ED NTGR kW	Based on EDNTGR kWh	Eval Report Table 26, pg 57-58	Eval Report Table 34, pg 68-69	Eval Report Table 30, pg 63-64
ED NTGR kWh	Eval Report Table 183, pg 197	Eval Report Table 26, pg 57-58	Eval Report Table 34, pg 68-69	Eval Report Table 30, pg 63-64
ED NTGR Therms	Based on EDNTGR kWh	Eval Report Table 26, pg 57-58	Eval Report Table 34, pg 68-69	Eval Report Table 30, pg 63-64
ED UES kW	Eval Report Table 195, pg 202	Eval Report Table 26, pg 57-58	Eval Report Table 34, pg 68-69	Eval Report Table 30, pg 63-64
ED UES kWh	Eval Report Table 195, pg 202	Eval Report Table 26, pg 57-58	Eval Report Table 34, pg 68-69	Eval Report Table 30, pg 63-64
ED UES Therms	N/A	N/A	N/A	N/A
ED IRate	Eval Report Table 181, pg 196	Eval Report Table 26, pg 57-58 (with data from Table 12, pg 36)	Eval Report Table 34, pg 68-69 (with data from Table 12, pg 36)	Eval Report Table 30, pg 63-64 (with data from Table 12, pg 36)
ED EUL	DEER 2008	DEER 2008	DEER 2008	DEER 2008
ED UES Interactive	DEER 2008	DEER 2008	N/A	N/A
Confidence	Eval Report Section 14.3, pg 194-195; Appendix K	Section 8.2.2, Appendix B	Section 8.2.2, Appendix B	Section 8.2.2, Appendix B

Table 26: Ex-ante v. Ex-post Savings Parameters – Upstream Screw-in CFLs[30]

		PG&E		SCE		SDG&E	
		Nonresidential	Residential	Nonresidential	Residential	Nonresidential	Residential
EX-ANTE UNITS SOLD 06-08							
CFL	Globe	n/a	n/a	54,711	494,582	0	277,168
	Reflector	n/a	n/a	100,575	916,689	0	375,491
	Twister/A-lamp	n/a	n/a	3,363,192	30,354,938	0	6,959,145
	All CFLs	5,234,370	47,704,381	3,518,478	31,766,209	0	7,611,804
EX-POST UNITS SOLD 06-08							
CFL	Globe	163,216	2,557,053	29,111	456,079	11,724	222,764
	Reflector	81,608	1,278,527	54,836	859,095	15,642	297,190
	Twister/A-lamp	2,475,445	38,781,972	1,825,330	28,596,836	294,608	5,597,549
	All CFLs	2,720,269	42,617,551	1,909,277	29,912,010	321,974	6,117,502

		PG&E		SCE		SDG&E	
		Nonresidential	Residential	Nonresidential	Residential	Nonresidential	Residential
EX-ANTE RES/NONRES							
	All CFLs	10%	90%	10%	90%	0%	100%
EX-POST RES/NONRES							
	All CFLs	6%	94%	6%	94%	5%	95%

		PG&E		SCE		SDG&E	
		Nonresidential	Residential	Nonresidential	Residential	Nonresidential	Residential
EX-ANTE INSTALLATION RATES							
	All CFLs	92%	76%	92%	90%	n/a	90%
EX-POST INSTALLATION RATES							
	All CFLs	73%	67%	81%	77%	76%	67%

Table 12: Final Adjustments to Quantity of Measures Rebated

Adjustment	PG&E	SCE	SDG&E
Invoice/Application Verification	96%	99%	96%
2008 Shipments Sold in 2008	88%	87%	87%
Leakage	99%	96%	93%
Final Adjustment	**86%**	**90%**	**85%**
Percent Residential	94%	94%	95%

By multiplying 0.67 with 0.86, the relevant values in these two tables, this calculation yields 0.5762 which is nearly identical to the 0.5738 in the ERT input file. In the ERT input file, this installation rate is applied to all years of the 2006-2008 portfolio, not just the 2008.

One can then identify other tables in the ULP that support the figures in the table. For example, Table 14 supports the numbers in the 2008 Shipments Sold in 2008. From this table it is clear that the ULP did correctly identify the values for 2008 Shipments Sold in 2008, however it was inappropriately to apply the 88% factor to all years of the 2006-2008 cycle. 94.1% would be the correct value to use if the factor would be applied to all years of the portfolio cycle.

Table 14: Shipments v. Sales Adjustments – Screw-in CFLs

IOU	Number of Rebated Units by E3 Program Year			2008 Shipment v. Sales Adjustment	Total 2008 Shipments Sold in 2008	Total 2006-2008 Shipments Sold in 2006-2008	Percent of 2006-2008 Shipments Sold in 2006-2008
	2006	2007	2008				
PGE	7,577,726	19,189,062	26,171,963	88.0%	23,031,327	49,798,115	94.1%
SCE	6,254,156	15,432,231	13,598,300	[illegible]	11,830,521	33,516,908	[illegible]
SDGE	953,605	3,827,638	2,830,561	87.0%	2,462,588	7,243,831	95.2%
Overall	14,785,487	38,448,931	42,600,824	87.6%	37,324,437	90,558,855	94.5%

Attachment 4 – 2008 IOU Codes & Standards Advocacy Verified Net Benefits

MEMORANDUM February 5, 2016

To: Pacific Gas & Electric Company

From: Yanda Zhang (ZYD Energy, Inc.)

Subject: 2008 IOU Codes & Standards Advocacy Verified Net Benefits

This document presents the method, data sources, and assumptions that ZYD Energy, Inc. (ZYD Energy) used to estimate the net benefits realized in 2008 from the 2006-2008 Codes & Standards (C&S) programmatic activities.

Standards for Net Benefits Assessment

The CPUC 2006-2008 C&S program evaluation[1] provided energy savings parameters and program attributions for 2005 Title 24 and Title 20 standards (pre-2006 C&S programmatic activity) and the associated savings and net benefits are not repeated here. The CPUC 2006-2008 C&S program evaluation did not include savings or net benefit estimates for standards resulting from post 2005 programmatic activity realized in 2008. The 2008 savings and net benefits resulting from post-2005 programmatic activity is the subject of this memorandum.

The CPUC 2010-2012 C&S program evaluation[2] provided energy savings parameters and program attributions for post-2005 building (Title 24) and appliances standards (Title 20 and Federal appliance standards). Among the standards evaluated by the CPUC 2010-2012 C&S program evaluation, four 2006 Title 20 appliance standards took effect in 2008 and, therefore, generated energy savings and net benefits in 2008 (and in 2009 as well). These four standards are listed in Table 1.

Table 1 Standards for Estimating Net Benefit Realized in 2008

Standard Number	Standard Name
Std 9	Residential Pool Pumps, 2-speed Motors, Tier 2
Std 11b_2010	General Service Incandescent Lamps, Tier 2
Std 22a	BR, ER and R20 Incandescent Reflector Lamps: Residential
Std 22b	BR, ER and R20 Incandescent Reflector Lamps: Commercial

[1] Final Evaluation Report, Codes & Standards (C&S) Programs Impact Evaluation, California Investor Owned Utilities' Codes and Standards Program Evaluation for Program Years 2006-2008 Prepared by KEMA, Inc., The Cadmus Group, Inc., Itron, Inc., and Nexus Market Research, Inc.

[2] Statewide Codes and Standards Program Impact Evaluation Report For Program Years 2010-2012, Prepared by: Cadmus and DNV GL, August 2014, CALMAC ID CPU0070.03

Methods and Data Input for Savings Estimation

The CPUC 2010-2012 C&S program evaluation developed Integrated Standards Savings Model (ISSM), a Microsoft Excel based tool[3], to calculate gross and net C&S savings using the verified energy savings parameters and program attributions. We used this tool with the verified energy savings parameters and program attribution to calculate the verified gross and net savings for the four standards listed above.

The CPUC 2010-2012 C&S program evaluation focused on verifying the C&S program achievement during the 2010-12 cycle; the ISSM tool did not include all input values for years before 2010, including 2008. As a result, the ISSM tool did not correctly calculate savings achieved in 2008. To assess the verified C&S savings achieved in 2008 using the ISSM tool, the missing input values are added into the corresponding input fields. The added values are summarized in Table 2.

The C&S Start Year can be verified by reviewing Table 4. Groups for Title 20 and Federal Appliance Standards of the CPUC 2010-2012 C&S program evaluation report.

2008 compliance rate and annual installations input values were added and set to be the same as the 2010 values provided by the CPUC 2010-12 C&S evaluation. This treatment is generally consistent with the CPUC evaluation findings. The CPUC evaluation found that annual installation of general service incandescent lamps (Std 11b) would reduce over time and, therefore, the use of the number of 2010 installation units for 2008 is a conservative assumption. For all other compliance rates and annual installations listed in Table 2, the CPUC evaluations and the ISSM tool assume constant values over all years.

The complete list of input values for 2008 savings calculation, including those presented in the existing CPUC ISSM tool, are provided in Table 4.

Table 2 Added ISSM Input Data

Standard Number	**Std 9**	**Std 11b_2010**	**Std 22a**	**Std 22b**
C&S Start Year	1/1/2008	1/1/2008	1/8/2008	1/8/2008
Compliance rate in 2008	Use values in the existing ISSM		82%	82%
Annual installation in 2008	163,000	80,220,000	1,688,793	113,902

[3] ISSM_Evaluation_v7a_Published_Rev2.xlsm

Verified 2008 Codes & Standards Savings

Table 3 provides the verified gross and net savings in 2008 from the four post-2005 standards obtained by running the CPUC published ISSM tool with the additional input data represented in Table 2. No other changes to the CPUC ISSM tool were made.

Table 3 Summary of Verified Net Savings in 2008 for PG&E

	Std 9	Std 11b_2010	Std 22a	Std 22b	Total
Annual Gross Savings					
GWh	91.4	50.9	2.6	1.1	**146**
MW	6.6	8.4	0.59	0.30	**15.9**
MMTherm	0.0	-0.68	-0.06	0.00	**-0.74**
Annual Net Savings					
GWh	67.6	35.7	1.4	0.6	**105**
MW	4.9	5.9	0.3	0.2	**11.3**
MMTherm	0.0	-0.48	-0.03	0.00	**-0.51**

2008 Codes & Standards Verified Net Benefits

Data needed for an E3 Calculator input file was developed in order to determine the 2008 verified net benefits associated with post-2005 standards listed in Table 1. The required input were developed in following ways:

Effective Useful Life (EUL): Selected from the data in the ISSM tool as shown in Table 4.

Unit Energy Savings (UES): Based on the UES provided in the ISSM tool as shown in Table 4 with additional consideration of Interactive Energy Savings Factors.

Net-to-Gross Ratio (NTG): Calculated by comparing the net and gross savings provided in Table 3, which were based on the CPUC issued ISSM tool.

Incremental Measure Costs (IMCs): Based on cost data provided in the Codes and Standards Enhancement (CASE) study reports. IOU C&S programs developed CASE reports to provide detailed market and technical data to support standards development. CASE studies were reviewed by the California Energy Commission and stakeholders and were used by the CEC as the technical basis for determining standards adoption. .

Load Shapes: Use the appropriate load shapes contained in each IOU E3 Calculator.

These assumptions correspond with the best available data for this time period.

Detailed Savings Calculation Input

Table 4 provides a complete list of input data for energy savings parameters and program attributions for calculating 2008 savings from post-2005 standards. The values presented in these table are based on those included in the existing CPUC ISSM tool, except those listed in Table 2.

Table 4 Savings Calculation Input Data

Standard Number	Std 9	Std 11b_2010	Std 22a	Std 22b
C&S Start Year	1/1/2008	1/1/2008	1/8/2008	1/8/2008
Utility Programs Effect (Units)	771	0	0	0
Assumed Measure Life	10	1	4	1
1st Year Potential Energy Savings Per Unit (kWh)	2065.00	2.61	5.80	33.60
1st Year Potential Demand Savings Per Unit (kW)	0.15	0.00	0.00	0.01
1st Year Potential Gas Savings Per Unit (therms)	0.00	0.00	0.00	0.00
Interactive Energy Savings Factor (kWh/kWh)	1.00	1.07	1.04	1.10
Interactive Demand Savings Factor (kW/kW)	1.00	1.27	1.32	1.32
Interactive Gas Savings Adjustment Factor (GWh/Therm)	0.0000	-0.0124	-0.0207	-0.0041
Natural Market Adoption (Yrs)	24	18	18	18
NOMAD Start Year	1975	1970	2000	2000
Attribution Score	79%	74%	61%	61%
Max Saturation	11%	9%	37%	37%
p-value	0.00	0.00	0.02	0.02
q-value	0.20	0.21	0.15	0.15
NOMAD in 2008	0.07	0.05	0.10	0.10
Compliance rate in 2008	86%	72%	82%	82%
Annual installation in 2008	163,000	80,220,000	1,688,793	113,902
Utility Programs Effect in 2008	771.00	0.00	0.00	0.00

Attachment 5 – CPUC & PG&E Analysis of Reported Versus Evaluated Savings Results for PG&E's 2006 to 2008 Energy Efficiency Portfolio

CPUC & PG&E Analysis of Reported Versus Evaluated Savings Results for PG&E's 2006 to 2008 Energy Efficiency Portfolio

This analysis shows and explains the variance between PG&E's reported 2006-2008 net energy savings of 5,251 GWh, and evaluated net savings of 1,766 GWh. The analysis finds that about 2/3 of the net energy savings adjustment of 3,485 GWh was realized (i.e., actually occurred) in California, but not attributed to PG&E.

Final Assessment March 6, 2015

Introduction:

This document highlights the results of a joint analysis conducted by the California Public Utilities Commission (CPUC) Staff and PG&E to clarify the variance between PG&E's reported net energy savings of 5,251 GWh and the CPUC's net evaluated savings of 1,766 GWh. Both parties saw the need to understand the sources for this large variance to guide future energy efficiency evaluation procedures and implementation efforts. The analysis is also useful for explaining these results to stakeholders. The exercise also identified enhancements that would make future evaluation results more transparent and easier to replicate.

It is important to realize that PG&E's reported energy savings are based on CPUC approved values for energy efficiency measures derived from previous evaluations. Some of these approved values changed significantly during the 2006-2008 energy efficiency portfolio cycle. The analysis sought to quantify and explain these changes.

Results:

Key results are discussed here and are followed by a graphical depiction of the sources of variance in Figure 1.

PG&E's 2006-2008 Energy Efficiency Portfolio remained cost-effective irrespective of these adjustments, i.e. the portfolio was cost effective even at the evaluated Net Savings of 1,766 GWh. The Total Resource Cost (TRC) test benefit/cost was 1.17 and the Program Administrator Cost (PAC) test benefit/cost was 1.47 (See CPUC's 2006-2008 Energy Efficiency Evaluation Report, Table 2).

Roughly 75% (3,812/5,251) of the reported net energy savings were realized by society. These represent energy savings that occurred and benefited California. The evaluators did not credit all of these savings to PG&E, because some savings occurred after the 2006-2008 program cycle, some savings were attributed to updating facilities to meet building codes, or some savings were presumed to have occurred in the absence of the program (due to free ridership).

The largest sources of variance were due to differences in when energy savings calculations were performed. PG&E developed its reported savings values, based on the best information available at the time, including guidance provided by the CPUC-ED. The CPUC-ED evaluators conducted their evaluation *after* programs had been implemented, using updated information and assumptions that were now available. Consequently, as assumptions changed in the savings estimation calculations, so did some savings estimates.

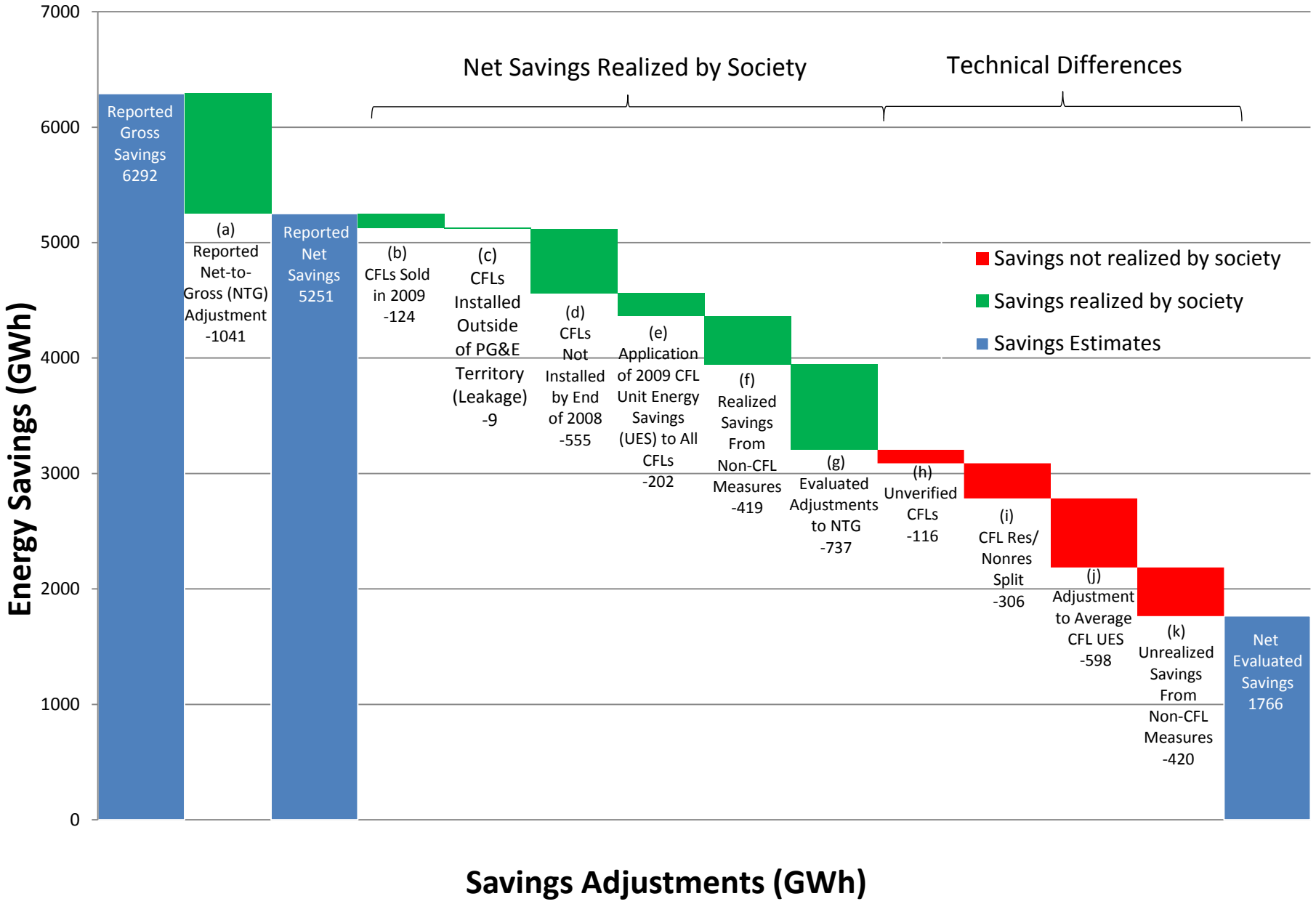
A significant portion of the downward adjustment reflects the success of the upstream CFL program in transforming the California residential lighting market. The Average CFL Unit Energy Savings (UES) adjustment (-598 GWh) is an indicator of the upstream lighting program's success at accelerating the uptake of CFLs in California. PG&E incented nearly 54 million CFLs during 2006-2008. During these three years, customers ended up installing CFLs in lower-use, lower wattage sockets, because the program had succeeded in saturating the high-use, high wattage sockets.

Evaluation practice has improved based on 2006-2008 experience. This exercise identified improvements that would enhance the transparency of, and facilitate future replication and comparisons of program and portfolio-wide results. The CPUC-ED and IOUs continue to work on providing timelier evaluation feedback to program implementation. The ex-ante review (EAR) process has been instituted to enable evaluators to be present earlier in a custom project's lifecycle and reach consensus on savings estimates. Impact evaluation efforts are trying to provide annual results in areas where most of the variance is expected to occur. Data and reporting by the IOUs and the CPUC-ED have improved. The increased detail in the utility's project files and the evaluation reports, especially including clearer descriptions of algorithms and the values used in them, provides more transparent analyses and facilitates replication and comparison of results.

Methodology:

PG&E evaluation staff and the CPUC-ED's consultant ("the analysis team") reviewed the 2006-2008 program evaluations of PG&E's energy efficiency portfolio. The compact fluorescent lamps (CFLs) component of the Upstream Lighting Program (ULP) was the largest source of variance. Consequently, the analysis team focused on investigating the savings variances in the evaluation of CFLs in the 2006-2008 ULP. Working from PG&E's CFLs tracking data and reported savings and the CPUC-ED's portfolio-wide database of results, the analysis team reviewed and re-calculated the savings reductions in each of the seven adjustments to CFLs savings that were done in the 2006-2008 ULP evaluation. In addition, the analysis team investigated the savings variances for non-CFL measures, including those incented in agricultural, industrial, commercial, and food processing programs. After the analysis team developed final estimates for the savings reductions, they classified the savings reductions as realized (i.e., energy savings that did occur but were not attributed to PG&E) or unrealized (i.e., energy savings that did not occur).

Figure 1. Adjustments to PG&E Reported Savings by CPUC-ED in 2006-2008 PG&E Energy Efficiency Portfolio



The following describes the primary factors explaining the variance between PG&E's reported electricity savings and the CPUC-ED's evaluated electricity savings estimate for the 2006 to 2008 portfolio of energy efficiency programs shown in Figure 1. The descriptions also explain why the analysis team identified each adjustment as realized or unrealized.

(a) Reported Net-to-Gross (NTG) Adjustment. PG&E reduced its reported total gross savings by 1,041 GWh using measure-specific NTG values in accordance with CPUC guidance. The reported portfolio average NTG=0.83. These savings were realized by society.
(b) CFLs Sold in 2009. Some CFLs incented in 2008 were purchased by customers in early 2009. The associated savings were credited to 2009, and reduced the 2008 evaluated savings estimates. These savings were realized by society because these lamps were eventually installed, just not during the program cycle.
(c) CFL Installed Outside of PG&E Territory (Leakage). A tiny portion (~ 0.45%) of CFLs was estimated to have been sold to non-PG&E (primarily SMUD) customers. These savings were realized by society because these lamps were installed in California.
(d) CFLs Not Installed by the End of 2008. The evaluation found significant amounts of CFLs in storage, as many customers were waiting for incandescent bulbs to burn out before installing the program CFLs. The evaluators also found that almost all (99%) of these CFLs were eventually installed. Per CPUC evaluation guidance, savings from bulbs installed after 2008 were counted in later years. In addition, about 2% of residential and 7% of non-residential CFLs burned out by the time evaluation was conducted and were not counted in evaluated 2006-2008 savings estimates. These savings were realized by society.
(e) Application of the 2009 CFL Unit Energy Savings (UES) to All CFLs. When developing the UES for CFLs for the reported savings values, PG&E used the best information available at the time – the 2005 UES assumption. In contrast, for the evaluation, the CPUC-ED used the 2009 UES value, and applied this to all 2006-2008 program bulbs. In hindsight, the analysis team agreed that an average of the two values would have been more appropriate, because bulbs installed early in the program cycle should have used the 2005 UES assumption, while those installed later should have used the 2009 UES assumption. Consequently, the analysis team identified that this adjustment, which is an additional adjustment to (j), as savings that were realized by society.
(f) Realized Savings from Non-CFL Measures. This is the portion of adjustments to savings from non-CFL measures that were likely realized by society. This adjustment represents adjustments to agricultural, commercial, industrial, and other residential (non-CFL) measures. Often the baseline used existing equipment, whereas evaluators set a different baseline. These savings were realized by society.
(g) Evaluated Adjustments to NTG. The CPUC-ED evaluators estimated higher levels of free ridership than those used by PG&E (a), per CPUC guidance. These savings were realized by society.
(h) Unverified CFLs. PG&E tracking database records verified 96% of the reported incented CFLs.
(i) CFL Res/Nonres Split. PG&E's reported savings assumed a 90/10 residential/non-residential split – i.e. 90% of the CFLs incented upstream were assumed to be installed in residences and 10% in non-residential locations. The CPUC-ED evaluation assumed a 94/6 residential/non-residential split. Since non-residential bulbs typically have higher hours of use (HOU) and have higher baseline wattages, the change resulted in lower evaluated savings.
(j) Adjustment to Average CFL UES. This adjustment captures the reduction in CFLs' UES in 2006-2008, where PG&E incented almost 54 million CFLs. As CFL market penetration increased, customers replaced lower wattage, less used, incandescent bulbs. For example, early installations may have been in kitchens and bathrooms, with later installations in closets and garages. This reduction in the average UES per CFL results in lower savings.
(k) Unrealized Savings From Non-CFL Measures. This is the portion of adjustments to savings from non-CFL measures that likely were not realized by society. The primary reasons for these adjustments included reduced facility operating hours due to the recession, reduced UES, verification losses, and calculation errors.

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